# 1N Prices DA:

### Notes

#### The argument is about the Kazakhstan economy. LOW prices are bad because then people pay less money for kazakhstan’s export which hurts their economy because people are giving them less money – the argument is that if Kazakhstan falls it’s in an important enough regional place that it will cause Central Asian war; it’s basically right between Europe and the middle east and china etc.

#### The aff puts prices down because the demand for uranium goes down. Less people want to buy it, so you have to lower the price to make it attractive to those that want it.

#### Applies to banning np in a decent number of places. It has to be significant enough to actually affect the demand for uranium. But if one country can do that all by itself then you still have a disad link.

#### It’s good and fairly lengthy for a da. Read against good people.

## 1NC Shell

### 1NC Kazakh Generic [1:45]

#### **Uranium prices are increasing despite recent set-backs, but positive approach to nuke power is key. SPUTNIK 9/16:**

[Sputnik News. “Uranium Price Slump Could Reverse After 2020 - Rosatom Mining Strategist.” September 16, 2016. Bracketed because of this random grammatical hiccup. // LHP MK]

LONDON (Sputnik) — **The** current **slump in global uranium prices may rebound after 2020 depending on investment in the nuclear power industry**, the Russian ARMZ Uranium Holding company's Deputy Director General for Strategy and Business Development Marina Liborakina said Friday. "**Everything depends on** the pace of **nuclear energy development**. The second factor is our largest companies' implementation of uranium investment projects. **Currently**, all **companies are streamlining the production process** in terms of both operating costs and asset structure," Liborakina said on the sidelines of the ongoing World Nuclear Association Symposium in London. © PHOTO: 2015.ATOMEXPO.RU Secret Siberian Facility Guards Unique Russian Recipe for Fissile Uranium ARMZ, which is the mining arm of the Rosatom state-owned nuclear energy corporation, is restructuring its extraction processes to improve their ecological aspects alongside many other uranium mining companies that are also seeking to become more eco-friendly and reduce costs, she added. "We have closed several mines that extract uranium using in-situ leaching while investing more actively in ecologically clean methods," Liborakina said. **Uranium spot prices collapsed** more than 60 percent between from over $70 per pound to around $25 per pound between 2011 and 2016 **in the wake of the Fukushima** Daiichi nuclear disaster and **amid a slump in global commodity prices. Rosatom has previously stressed that i[t]n will take several years for the market to re-balance.**

#### But the aff freezes the price rise for uranium and prevents development of a positive approach to uranium --- empirics. MORNING ’12:

[Money Morning. “Uranium Stocks to Benefit From Nuclear Power Resurgence,” 23 Nov 2012, <http://www.marketoracle.co.uk/Article37687.html>]

Don Miller writes: Nuclear power is poised to make a comeback, and the spike in uranium demand it will bring over the next few years will send uranium stocks soaring. While the Fukushima nuclear disaster in Japan in March 2011 stirred a lot of talk about abandoning nuclear power, nations have since come to realize their energy needs can't be met without nuclear being part of the equation. The Japanese blowout scared the public so badly, in fact, that many governments vowed to severely cut back on nuclear power. Germany said it would quit using it altogether. But then reality struck**.** Major export economies in Europe and Asia have energy-intensive industries that can't just dump nuclear energy overnight. The best proof that nuclear is not going away is right in Japan, which already has been forced to restart two reactors, and more will be restarted soon. The Prime Minister of Japan called restarting the reactors a "matter of national survival," because the high cost of imported liquid natural gas was crippling the economy. And nuclear energy has proven itself to be a safe alternative to the smog-belching coal plants in emerging countries like China and India. Even oil-rich countries like Saudi Arabia are building new nuclear reactors now -- a clear sign nuclear energy is here to stay. Simply put, the world not only needs low-cost nuclear power - it needs more, not less of it. And uranium is the only fuel that can possibly give billions of new consumers in energy-starved countries like India and China the power they need. Demand Will Drive Uranium Prices Nuclear power [is] currently provides about 13.5% percent of the world's electricity, and that's likely to grow given the new capacity slated to come online. A total of 31 nations across the globe have 436 nuclear reactors under production. Globally a total of 95 nuclear reactors are planned over the next two decades with 62 already under construction, according to the World Nuclear Association (WNA). And **each of those plants will use 500,000 pounds of refined yellowcake per year**. But miners can't satisfy the world's current appetite for uranium, much less higher demand in the future. The WNA has projected 52,221 tons of production in 2012. Meanwhile, uranium demand is expected clock in at around 77,000 tons. Demand for uranium is expected to jump 7% per year, reaching 110,000 tons by 2017. Altogether, the planet could come up 400 million pounds short by 2020. Still, the cost of uranium production means the industry needs to get about $85 per pound to make it worth bringing new mines into production. But rising demand should take care of that. "When those supply and demand lines intersect, the only thing that can happen is prices go up," noted natural resources expert Rick Rule recently told The Daily Crux. "If the prices don't go up, the lights will go out." Fukushima Creates Uranium Stock Opportunity The Fukushima disaster and all the negative talk that followed sent uranium prices -- and uranium mining stocks -- into a nosedive. Prices for uranium tumbled to about $41 per pound from $68, according to Ux Consulting. Uranium stocks suffered accordingly. The Global X Uranium ETF (NYSEArca: URA), for example, has fallen nearly 23% year-to-date. But for investors today, that decline is an opportunity. Despite what happened at Fukushima, the overwhelming appeal of nuclear energy has set the stage for a rebound**.** It's only a matter of time before the demand for energy in emerging markets will drive a new nuclear boom. And with prices at rock-bottom, it's time to put uranium mining stocks on your radar**.**

#### Uranium price freezes kill Kazakhstan’s econ. VERGNAUD ’16:

[Vergnaud, Lara. “Can uranium save Kazakhstan?” Blouin News, 20 Jan 2016, <http://tinyurl.com/hkpcmet>.]

Unlike most energy exporters, **Kazakhstan is not** dangerously over-**dependent on fossil fuel prices.** **Being the world’s largest producer of uranium gives the country’s economy a major lifeline,** especially **as global demand for nuclear power is on the rise in a carbon-limited future**. On Monday the national atomic company Kazatomprom said that it had increased uranium production from 22.8 million tons in 2014 to 23.8 million tons in 2015. That rise was not in response to the short-term fluctuations of the uranium price on the global market, which stayed between $35 and $40/pound for all of last year. **The price of uranium had been on the way up** (reaching $65/pound) **until the Fukushima** disaster hit Japan in March 2011, at which point it began a steady decline to about $28/pound in mid-2014. **Since then it has recovered** to the present price range, **but Kazakhstan is anticipating a future rise that will prove durable**. Nuclear power generates about 11% of the world’s electricity, but after the Paris climate deal and countries’ earlier pledges to build more reactors, that percentage will grow. China plans to build 6-8 nuclear power plants annually for the next five years, and India aims to generate 25% of its electricity from nuclear by 2050, up from 4% in 2013. (Even Japan intends to restart several nuclear reactors, perhaps paving the way for a return to its pre-Fukushima level of 30% of electricity provided by nuclear power.) Both **Bank of America-Merrill Lynch (BofA-ML) and BMO Capital have forecasted that uranium prices will rise** to test $60 a pound by 2018. And BofA-ML predicted that uranium consumption — which reached 150 million pounds in 2015 — will rise to almost 200 million pounds by 2020. Currently there is a global surplus of 20-27 million pounds, so uranium reactors aren’t going to run out of fuel anytime soon. But even with increased production from Kazakhstan (and potentially Canada, Australia, and lesser producers), analysts estimate the surplus will only be 7.5-10 million tons by 2020. And the recent agreements Kazakhstan has signed will make it even more indispensable on the global level. In December, Kazatomprom and China General Nuclear Power deepened their existing cooperation with a new agreement for the design and construction of a fuel assembly production plant in Kazakhstan and the joint development of uranium deposits in the country. Additionally, last July **Kazakhstan signed a deal to supply India with 5,000 tons of uranium through 2019, beginning this year**. (This will be a significant increase from the first contract that expired in 2014 and entailed Kazakhstan supplying 2,100 tons.)

#### Kazakh economic stability key to Central Asian stability --- checks back terror and competition. TELEKI ’15:

Margarita Assenova the Director of the Institute for New Democracies at CSIS // Natalie Zajicova the Program Officer // Janusz Bugajski the CSIS NEDP Director // Ilona Teleki the Deputy Director and Fellow at CSIS // Besian Bocka the Program Coordinator and Research Assistant at CSIS [“Kazakhstan’s Strategic Significance,” CSIS Institute for New Democracies, <http://eurodialogue.org/Kazakhstan-Strategic-Significance>. No Date, but makes citations from 2015.]

The decision by the Organization for Security and Cooperation in Europe (OSCE) to award Kazakhstan the chairmanship of the organization for 2010 underscores a growing recognition of the country’s regional and continental importance. **Kazakhstan is a strategic linchpin in the vast Central Asian-**Caspian Basin zone, a region rich in energy resources and a potential gateway for commerce and communications between Europe and Asia. However, it is also an area that faces an assortment of troubling security challenges. Ensuring a stable and secure Central Asia is important for the international interests of the United States and its European allies for several prescient reasons: • Asian Security: **Because of its proximity to Russia, China, Iran, and the South Asian sub-continent, Kazakhstan’s security and stability is an increasingly vital interest to all major powers**. Kazakhstan’s tenure as chair of the OSCE will become an opportunity for greater multilateral cooperation in achieving this objective while strengthening the role and prestige of the OSCE throughout Central Asia. • Afghanistan: Central Asia is a key staging area for U.S. and NATO military operations in Afghanistan against Taliban insurgents and Al Qaeda militants. Central Asia is a crucial conduit for U.S. and NATO troops and supplies into Afghanistan. U.S. offi cials recently reached new agreements with Russia, Kazakhstan, and other Central Asian countries to allow Afghanbound non-military supplies through their territories. • Trans-National Terrorism: The **Taliban resurgence** in Afghanistan **stimulates** cross-border **terrorism that may endanger the stability of several Central Asian** neighbors and undermine Western interests. Central Asian states have been the victims of Afghanistan-based transnational terrorism. These states, including Kazakhstan, can support international efforts to counter regional terrorist networks. • Organized Crime and Drug Traffi cking: Central Asia is an important transit region for narcotics traffi cking between Afghanistan and the countries of Europe and Asia. Joint initiatives that will enable the Kazakh government to control and monitor borders more effectively, intercept smuggling operations, and eradicate criminal networks will buttress international security and curtail funding to cross-border terrorist groups. • Energy Security: Central Asia has the potential to be a vital energy source for Europe. The region contains a vast storehouse of oil and natural gas, which Europe urgently needs in order to lessen its reliance on Russian and Middle Eastern energy supplies. Disputes between Russia and several energy transit states, such as Ukraine, have increased Europe’s interest in developing direct supply lines between Europe and the Caspian countries. Challenges to International Interests Despite the strategic significance of Central Asia and the Caspian Basin, in recent years Western countries have not paid sufficient attention to the region. This is due to a combination of factors, including the absence of a shared strategic framework for helping to stabilize and develop the heartland of Asia; insufficient focus on consolidating close political ties with key countries in the region through ustained high-level engagement; and opposition on the part of other major powers competing for influence in Central Asia. Many Western experts conclude that Russia’s leaders have sought to use multi-national organizations, Moscow’s political connections and its economic leverage to assert greater control over ex-Soviet neighbors. There are reports that the Central Asian governments were pressured to curtail Western security interests, including limiting its military presence in the region by, for example, urging Uzbekistan and Kyrgyzstan to evict the U.S. military from bases on their territory. Kazakh leaders are supportive of a more effective American and European role in Central Asia to help promote the region’s security and development, but without undermining Astana’s cordial relations with Russia. Kazakhstan’s independent foreign policy helps provide Western access to the region and enhances its position as a vital transport corridor. **Kazakhstan is also a stabilizing factor in the geopolitical competition of the regional powers for access and influence** across Central Asia. With its reinvigorated commitment to securing Afghanistan and stabilizing the wider region, the Obama administration has an ideal opportunity to reach out to key partners such as Kazakhstan and to enhance Astana’s role as a regional stabilizer. Kazakhstan as a Regional Stabilizer Despite having the largest territory and economy in Central Asia, **Kazakhstan** is not a source of insecurity or threat to any of its neighbors. It does not employ territorial, ethnic, economic, or energy instruments to target and undermine any government in the region. On the contrary, Astana **has sought to establish[es] a system of collective security in Eurasia that would avert the emergence of a single dominant power**. Kazakhstan’s “multi-vector” foreign policy, which seeks to pursue cooperative relations with all major powers, leads Astana to resist any hegemonic ambitions by larger countries that would undercut Kazakhstan’s political or economic independence. While it is a member of the Commonwealth of Independent States (CIS), the Collective Security Treaty Organization (CSTO), and the Shanghai Cooperation Organization (SCO), Kazakhstan has sought to diversify its security relations and keep its freedom to establish and maintain international partnerships. Indeed, Astana has developed productive contacts with NATO by participating in NATO’s Euro-Atlantic Partnership Council (EAPC) and its Partnership for Peace (PfP) program. It was the only Central Asian government to negotiate an Individual Partnership Action Plan (IPAP) with NATO in January 2006. NATO’s June 2004 summit affirmed the growing importance of Central Asia by designating the region as an area of “special focus” and stationing a liaison officer in the Kazakh capital of Astana in order to develop NATO assistance programs to modernize national military structures. A NATO Secretary General Special Representative for the Caucasus and Central Asia was also appointed. Astana has underscored that neither the CSTO nor the SCO should become exclusive military alliances or anti-Western blocs that would challenge NATO’s mission in the wider region. Kazakhstan supports NATO operations in Afghanistan and grants overflight rights to U.S. and other NATO warplanes transporting non-lethal cargo to Afghanistan, as well as emergency landing rights for U.S. military aircraft in the Kazakh city of Almaty. The Kazakh authorities are also developing a Peacekeeping Battalion (KAZBAT), which is slated to become fully operational by 2011 and potentially available for international peace stability missions. Kazakhstan is the only Central Asian country to have an Action Plan to assist in the reconstruction process in Afghanistan, including granting more than $3 million in the 2007-2008 fiscal year for social and infrastructure projects, humanitarian aid, and training for Afghan law enforcement and border patrol officers. For 2009-2011, Kazakhstan has committed an additional $5 million to improve the water supply and distribution infrastructure for shipments of grain and other commodities. Kazakhstan also provides funding to support U.S. objectives in the region. Astana is the only regional donor giving significant aid to Kyrgyzstan, Tajikistan, and Afghanistan. According to the U.S. State Department’s Background note on Kazakhstan, “in 2006, Kazakhstan became the first country to share directly in the cost of a U.S. Government’s foreign assistance program. Through 2009, the Government of Kazakhstan will contribute over $15 million of a $40 million USAID economic development project aimed at strengthening Kazakhstan’s capacity to achieve its development goals.” Kazakhstan has initiated and championed the Conference on Interaction and Confidence-Building in Asia (CICA). Modeled after the OSCE, the CICA process aims to promote peace and security throughout Eurasia through confidence-building measures and other means. The first CICA summit, held in June 2002, was attended by leaders from 16 states who signed the “Almaty Act,” as well as a declaration to eliminate terrorism and promote inter-cultural dialogue. The second CICA summit (hosted by Kazakhstan in June 2006) adopted the Catalogue of Confidence Building Measures (CBM)—a road map for implementing the CBM on a bilateral and multilateral basis. At the last CICA working meeting in India in February 2009, the participating states selected Turkey to chair the conference and host the third CICA summit in 2010. The Turkish chairmanship will expand CICA geographically and move it closer to Europe. Multi-National Counter-Terrorism **Kazakhstan has been combating several potential threats to its own stability** and that of its neighbors, including terrorism, drug smuggling, and organized crime. Although Kazakhstan is generally not a source of these maladies, it is a transit country for such illicit activities. Kazakh leaders have been especially concerned about possible terrorist strikes against their country’s energy infrastructure that could affect exports to European and other consumers. To counter terrorist threats, the Kazakh government has supported multilateral efforts in key multilateral organizations to make counter-terrorism an essential ingredient of their security focus. Astana has also assigned troops to the Central Asian Rapid Reaction Force (CARRF), which is designed to defend each country against major terrorist threats. Regional Non-Proliferation KazakhstanwasthefirstformerSovietrepublictoabandon its nuclear arsenal. It closed the largest nuclear weapons test site and has spearheaded regional denuclearization. Kazakh leaders have also made major progress in downgrading nearly all of the country’s highly enriched uranium, thus lessening the opportunities for such material to fall into the hands of foreign governments or terrorist groups. Astana’s non-proliferation initiatives have earned it praise from a number of international leaders. With impetus from Kazakhstan, the Central Asian states have agreed to coordinate their nonproliferation and export control policies, especially to prevent the smuggling of Weapons of Mass Destruction (WMD) and related materials from the former Soviet Union. In September 2006 in Semipalatinsk, a former Soviet nuclear testing site in Kazakhstan, representatives of the five Central Asian states signed a treaty to create a Central Asian Nuclear Weapon Free Zone, which entered into force on March 21, 2009. The signatories pledged not to develop, manufacture, or otherwise acquire nuclear devices or to assist third parties in developing nuclear weapons programs. The treaty further addressed environmental protection as each of the five states share common problems of environmental damage resulting from the production and testing of Soviet nuclear weapons. Counter-Narcotics Trafficking Countering the trafficking of narcotics from Afghanistan through Central Asia is a major security challenge for all countries in the region, as well as an issue of concern for European and Asian states seeking to stabilize Afghanistan. Proceeds from large-scale smuggling finance organized crime and cross-border terrorism. Central Asian states, including Kazakhstan, have been active in joint operations to intercept drug shipments from Afghanistan and are expanding their counter-narcotics agencies to deal more effectively with the threat. The Central Asian Regional Information and Coordination Centre (CARICC), established in Almaty under UN auspices, serves as the main regional communication center for analysis and exchange of information on transnational crime and the coordination of joint operations. The OSCE, which Kazakhstan will chair in 2010, has established the priority of curbing drug and arms smuggling, strengthening border controls to curtail illegal migration, and countering the financing of terrorist and criminal organizations. Energy Security Kazakhstan is a major producer and exporter of crude oil, projected to export three million barrels of oil per day, or 150 million tons per year, by 2015. Kazakhstan also possesses substantial natural gas reserves and some of the world’s largest reserves of uranium. The three energy-rich states of Central Asia (Kazakhstan, Uzbekistan, and Turkmenistan) understand that their political independence and energy security requires diversifying their energy customers and avoiding reliance on any single power or transit route. Currently, Russia is the main transit route for energy exports from Central Asia. Kazakhstan supports building oil and gas pipelines that would channel its energy resources directly to Europe and China. The Kazakh energy industry favors a direct energy connection with Azerbaijan across the Caspian Sea that would help supply the European market. Astana is seeking to diversify its economy and avoid over-dependence on natural resources and energy exports. Until recently, oil and gas revenues have been aggressively used to develop a stronger economic foundation for expansion into new markets. Kazakhstan seeks to attract advanced technologies and modern management practices into its priority economic sectors, including high technology, financial services, and agriculture. However, the current global financial crisis poses considerable challenges to this agenda, not least because of the weaknesses it has exposed in Kazakhstan’s banking and financial services sector. Economic Development **Sustained economic development is a major determinant of long-term regional stability. Kazakhstan has emerged as a successful model of economic development in Central Asia** and the secular Muslim world. It has the largest economy in Central Asia with a Gross Domestic Product (GDP) exceeding the combined total of its four Central Asian neighbors. The government is in the process of negotiating its entry into the World Trade Organization (WTO) and is a leading proponent of deepening economic cooperation in Central Asia and the Caspian region. Kazakh leaders have focused on developing the Euro-Asian Economic Community (EurAsEC), an organization that also involves Belarus, Kazakhstan, Kyrgyzstan, Russia, and Tajikistan. More generally, Kazakhstan has strongly supported deeper economic integration among these states. Nonetheless, Astana opposes over-reliance on any single country because this would undermine Kazakhstan’s independence and integration into the global economy. **In positioning Kazakhstan as a potential economic hub** and the core of a “Eurasian transport corridor,” President Nursultan **Nazarbayev has proposed creating a regional organization**, styled as the Eurasian Economic Union (EEU), **to harness and intensify trans-border cooperation in such areas as water resource management, transportation infrastructure, crisis-response, environmental protection, and region-wide economic development. Such** a process, even without the support of all Central Asian countries, **could be the first steps toward lowering barriers to trade, harmonizing customs, and building closer economic associations. Kazakh** officials contend that closer **economic integration would reduce** regional **tensions, attract greater levels of foreign direct investment, and increase the region’s leverage and competitiveness in the international arena**. Integration has also been fostered by tangible investments and capital flows as Kazakhstan has played a major role in exporting capital to its neighbors.

#### Escalates into Central Asia nuclear conflict --- extinction. ROGER ’11.

Honorary senior fellow, department of politics and international relations, university of Kent at Canterbury and senior fellow in Eurasian military studies, Jamestown Foundation [Roger, “General Makarov Highlights the “Risk” of Nuclear Conflict,” Eurasia Daily Monitor, 6 Dec 2011, <http://tinyurl.com/gruqsue>.]

In the current election season the Russian media has speculated that the Defense Minister Anatoliy Serdyukov may be replaced, possibly by Dmitry Rogozin, Russia’s Ambassador to NATO, which masks deeper anxiety about the future direction of the Armed Forces. The latest rumors also partly reflect uncertainty surrounding how the switch in the ruling tandem may reshuffle the pack in the various ministries, as well as concern about managing complex processes in Russian defense planning. On November 17, **Russia’s Chief of the General Staff**, Army-General Nikolai Makarov, **offered** widely **reported comments on the potential for nuclear conflict erupting close to the country’s borders**. His key observation was controversial, based on estimating that **the potential for armed conflict along the entire Russian periphery had grown** dramatically over the past twenty years (Profil, December 1; Moskovskiy Komsomolets, November 28; Interfax, November 17). During his speech to the Defense Ministry’s Public Council on the progress and challenges facing the effort to reform and modernize Russia’s conventional Armed Forces, Makarov linked the potential for local or regional conflict to escalate into large-scale warfare “possibly even with nuclear weapons.” Many Russian commentators were bewildered by this seemingly “alarmist” perspective. However, they appear to have misconstrued the general’s intention, since he was actually discussing conflict escalation (Interfax, ITAR-TASS, November 17; Moskovskiy Komsomolets, Krasnaya Zvezda, November 18). Makarov’s remarks, particularly in relation to the possible use of nuclear weapons in war, were quickly misinterpreted. Three specific aspects of the context in which Russia’s most senior military officer addressed the issue of a potential risk of nuclear conflict may serve to necessitate wider dialogue about the dangers of escalation. There is little in his actual assertion about the role of nuclear weapons in Russian security policy that would suggest Moscow has revised this; in fact, Makarov stated that this policy is outlined in the 2010 Military Doctrine, though he understandably made no mention of its classified addendum on nuclear issues (Kommersant, November 18). Russian media coverage was largely dismissive of Makarov’s observations, focusing on the idea that he may have represented the country as being surrounded by enemies. According to Kommersant, claiming to have seen the materials used during his presentation, armed confrontation with the West could occur partly based on the “anti-Russian policy” pursued by the Baltic States and Georgia, which may equally undermine Moscow’s future relations with NATO. Military **conflict may erupt in Central Asia, caused by instability in Afghanistan or Pakistan; or western intervention against a nuclear Iran or North Korea; energy competition in the Arctic or foreign inspired “color revolutions” similar to the Arab Spring** and the creation of a European Ballistic Missile Defense (BMD) system that could undermine Russia’s strategic nuclear deterrence also featured in this assessment of the strategic environment (Kommersant, November 18). Since the reform of Russia’s conventional Armed Forces began in late 2008, Makarov has consistently promoted adopting network-centric capabilities to facilitate the transformation of the military and develop modern approaches to warfare. Keen to displace traditional Russian approaches to warfare, and harness military assets in a fully integrated network, Makarov possibly more than any senior Russian officer appreciates that the means and methods of modern warfare have changed and are continuing to change (Zavtra, November 23; Interfax, November 17). The contours of this evolving and unpredictable strategic environment, with the distinctions between war and peace often blurred, interface precisely in the general’s expression of concern about nuclear conflict: highlighting the risk of escalation. However, such potential **escalation is linked to the reduced time involved in other actors deciding to intervene in a local crisis as well as the presence of network-centric approaches** among western militaries and being developed by China and Russia. From Moscow’s perspective, **NATO “out of area operations” from Kosovo to Libya blur the traditional red lines in escalation**; further complicated if any power wishes to pursue intervention in complex cases such as Syria. Potential escalation resulting from local conflict, following a series of unpredictable second and third order consequences, makes Makarov’s comments seem more understandable; it is not so much a portrayal of Russia surrounded by “enemies,” as a recognition that, **with weak conventional Armed Forces, in certain crises Moscow may have few options** at its disposal (Interfax, November 17). There is also the added complication of a possibly messy aftermath of the US and NATO drawdown from Afghanistan and signs that the Russian General Staff takes Central Asian security much more seriously in this regard. The General Staff cannot know whether the threat environment in the region may suddenly change. Makarov knows the rather limited conventional military power Russia currently possesses, **which may compel early nuclear first use likely involving sub-strategic weapons, in an effort to “de-escalate”** an escalating conflict close to Russia’s borders. Moscow no longer primarily fears a theoretical threat of facing large armies on its western or eastern strategic axes; instead the information-era reality is that smaller-scale intervention in areas vital to its strategic interests may bring the country face-to-face with a network-centric adversary capable of rapidly exploiting its conventional weaknesses. As Russia plays catch-up in this technological and revolutionary shift in modern warfare capabilities, the age-old problem confronts the General Staff: the fastest to act is the victor (See EDM, December 1). Consequently, Makarov once again criticized the domestic defense industry for offering the military inferior quality weapons systems. Yet, as speed and harnessing C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) become increasingly decisive factors in modern warfare, the risks for conflict escalation demand careful attention—especially when the disparate actors possess varied capabilities. Unlike other nuclear powers, Russia has to consider the proximity of several nuclear actors close to its borders. In the coming decade and beyond, Moscow may pursue dialogue with other nuclear actors on the nature of conflict escalation and de-escalation. However, **with a multitude of variables at play ranging from BMD, US Global Strike capabilities, uncertainty surrounding the “reset”** and the emergence of an expanded nuclear club, and several potential sources of instability and conflict, **any dialogue must consider escalation** in its widest possible context. Makarov’s message during his presentation, as far as the nuclear issue is concerned, was therefore a much tougher bone than the old dogs of the Cold War would wish to chew on.

# 2N Extensions/Extras:

## Extensions

Market predictions have uranium prices are set to increase--- that is the Stafford evidence.

Uranium prices will increase due to new activity and interests in nuclear power coming in squo ---that is the Morning Evidence. However, many governments depend on nuclear power for their economies, making it likely for economic collapse if you just take away all nuclear power plants.

## Uniqueness

### Uq. – Updated Generic (9/16)

#### **Uranium prices are increasing despite recent set-backs, but positive approach to nuke power is key. SPUTNIK 9/16:**

[Sputnik News. “Uranium Price Slump Could Reverse After 2020 - Rosatom Mining Strategist.” September 16, 2016. Bracketed because of this random grammatical hiccup. // LHP MK]

LONDON (Sputnik) — **The** current **slump in global uranium prices may rebound after 2020 depending on investment in the nuclear power industry**, the Russian ARMZ Uranium Holding company's Deputy Director General for Strategy and Business Development Marina Liborakina said Friday. "**Everything depends on** the pace of **nuclear energy development**. The second factor is our largest companies' implementation of uranium investment projects. **Currently**, all **companies are streamlining the production process** in terms of both operating costs and asset structure," Liborakina said on the sidelines of the ongoing World Nuclear Association Symposium in London. © PHOTO: 2015.ATOMEXPO.RU Secret Siberian Facility Guards Unique Russian Recipe for Fissile Uranium ARMZ, which is the mining arm of the Rosatom state-owned nuclear energy corporation, is restructuring its extraction processes to improve their ecological aspects alongside many other uranium mining companies that are also seeking to become more eco-friendly and reduce costs, she added. "We have closed several mines that extract uranium using in-situ leaching while investing more actively in ecologically clean methods," Liborakina said. **Uranium spot prices collapsed** more than 60 percent between from over $70 per pound to around $25 per pound between 2011 and 2016 **in the wake of the Fukushima** Daiichi nuclear disaster and **amid a slump in global commodity prices. Rosatom has previously stressed that i[t]n will take several years for the market to re-balance.**

### Uq. – Generic

#### **Uranium prices unstable but increasing --- positive perception key. STAFFORD 6/14:**

[Stafford, James. “Uranium Prices Set To Double By 2018.” June 14, 2016. <http://oilprice.com/Energy/Energy-General/Uranium-Prices-Set-To-Double-By-2018.html>.// LHP MK]

**With prices set to double by 2018, we’ve seen the bottom of the uranium market,** and **the negative sentiment** that has followed this resource around despite strong fundamentals, **is starting to change.** Billionaire investors sense it, and they’re always the first to anticipate change and take advantage of the rally before it becomes a reality. The turning point is where all the money is made, and there are plenty of indications that the **uranium recovery is** already **underway**. It’s been a very tough few years for uranium. But it now looks like we’ve reached the bottom, and the future demand equation says **there’s nowhere to go but** up—**significantly up**. x **Uranium** analyst David Talbot of Dundee Capital **Markets is forecasting 6 percent compound annual demand growth through 2020, which is** enough, he says, **to “kick-start” uranium prices** up to and beyond 2007 levels. Morningstar analyst David Wang[predicts](http://www.fxnewscall.com/uranium-rally-to-lift-prices-new-demand-exhausting-supply-glut/1941312/) **prices will double within the next two years.**

### Uq.– Will Rebound/NP Key

#### Prices are rebounding but nuclear power is key. RYAN 4/23:

Commodities market analyst [Ryan, “Cameco Corp.: Will Uranium Prices Ever Recover?” The Motley Fool, 23 Apr 2016, <http://www.fool.com/investing/general/2016/04/23/cameco-corp-will-uranium-prices-ever-recover.aspx>.]

J.P. Morgan estimates that uranium prices will more than double by 2020, based on classic supply and-demand dynamics. By 2035, the world's energy demand is expected to grow by nearly 50%. Much of that demand will be met by building nuclear reactors. For example, according to Barron's, "China's annual uranium needs will roughly double by 2020, outpacing the rest of the world's combined growth." By 2025, Cameco expects to see around 113 new reactors built, more than 60 of which are under construction right now. Demand should also be buoyed through capacity additions at existing plants**.** In all, 80 gigawatts of nuclear power may be added to the world's grids over the next decade, with continued growth expected beyond 2025**.**

#### Increasing --- demand side key. LEVIT 5/25:

Levit 16— [Donald, “Uranium Price Still Below $30 Per Lb.; Market Remains Quiet,” Economic Calendar, 25 May 2016, http://tinyurl.com/jqu3hdv.]

There are currently dozens of major nuclear reactor construction projects in the works, with many more planned. While this fact has been known for years, construction projects and new planning of nuclear projects have been delayed longer than expected in the aftermath of Fukushima. However, once these projects are up and running there will be a huge increase in the demand for uranium. We have already experienced what a price spike in uranium can do. In the 2000s, uranium skyrocketed from $8 per pound to a record high of $140 per pound.Uranium prices**, while depressed,** have reboundedafter falling to an eleven-year low of $25.50 per lb. Uranium saw a price increase after Cameco suspended operations at its Rabbit Lake Mine. This suspension makes sense, with Rabbit Lake’s production costs around $40 per lb., the mine was losing a fair bit of money. The collapse in uranium’s price has caused many miners to suspend expansion plans and abandon plans to develop new mines. These supply changes could help uranium prices rebound, but we also need to see a recovery in demand**.**

### Uq.– Investments

#### **Investments are way up --- uranium price increase is gaining momentum. STAFFORD 6/14:**

[Stafford, James. “Uranium Prices Set To Double By 2018.” June 14, 2016. <http://oilprice.com/Energy/Energy-General/Uranium-Prices-Set-To-Double-By-2018.html>.// LHP MK]

The Billionaires’ Sixth Sense Billionaire investors are lining up behind uranium **with major acquisitions,** betting that they are on the edge of a price break-out. Earlier in June, Hong Kong billionaire investor Li Kashing, though his CK Hutchinson Holdings and CEF holdings, said he would buy $60 million in convertible bonds from NexGen Energy targeting uranium projects in Canada’s Saskatchewan province. "The current spot prices seem low, but the fundamentals indicate there's going to be a very large demand and supply gap -- that's what you're making a call on,” NexGen CEO Leigh Curyer said of the deal. NexGen is slated to start production in the 2020s. Mr. Li’s $60-million bet on Saskatchewan uranium is near another uranium company, Zadar Ventures Ltd, which has four projects in Saskatchewan and one in Alberta, and stands to benefit from the high-dollar renewed focus on this resource. The Athabasca Basin is elephant country in terms of uranium deposits. It represents the world's highest-grade uranium deposits and is the home to all of the major uranium producers, developers and explorers. If your going to look for the world's next uranium mine, the Athabasca Basin is the place to do so. Considering that nearly half of the U.S.’ 57 million pounds of uranium imports last year came from Canada and Kazakhstan, with Canada providing 17 million pounds—these producers are extremely well-positioned for what comes next**.** Talbot predicts that theUranium pound price could reach $65 within two years, and notes that some mines will be extremely profitable at this price—particularly those in the Athabasca Basin and in the western and southwestern U.S., while development of uranium deposits in Africa will require higher prices. The Athabasca Basin is precisely where Zadar and NexGen operate, along with other promising contenders, including Cameco Corp. (TSX:CCO) and Denison Mines Corp. (DML:TSX). Last month, billionaire D.E. Shaw let us all know that he’d acquired 1.4 million shares in Cameco, eyeing rising uranium prices, tightening supplies and growing demand—and joining the ranks alongside George Soros. And others have lined up, too, including well-known money managers Ken Griffin, Ray Dalio and Steve Cohen. Then we have Bill Gates—who has jumped on the uranium bandwagon with great determination. Through his TerraPower company, Gates is developing a Fourth Generation nuclear reactor that would run on depleted uranium, rather than enriched uranium.

## Link/Int. Link

### Link – Japan???

#### Uranium prices are recovering because of Japan, but a ban in Japan kills demand --- empirics. HOYLE 6/31:

[Hoyle, Rhiannon. Negishi, Mayumi. “Japan Nuclear-Power Jitters Weigh on Global Uranium Market.” June 31, 2016. // LHP MK]

Five years ago, meltdowns at the Fukushima Daiichi power plant in **Japan sparked** what would become a prolonged **slide in prices for uranium** nuclear fuel. Today, the world’s worst nuclear disaster in a quarter-century is depressing prices again.​ **Antinuclear sentiment** is gaining momentum **in Japan with** theelection three weeks ago of **an antinuclear governor** in the only Japanese prefecture with an operating nuclear-power plant, and the likelihood that a court injunction **will halt** the next **reactor[s]** slated to go online in August. **Japan was** once the world’s **No. 3 nuclear-power generator**, behind the U.S. and France. The **slump in the uranium market is** being **exacerbated by weak demand** from the U.S. and plentiful uranium supplies in China, an emerging nuclear-power producer. The price of uranium has slumped to $25 a pound, its lowest level since April 2005, according to the Ux Consulting Co., a nuclear-fuel research firm​that publishes weekly market prices. The fuel’s value is down 27% since the start of this year and is a fraction of the $136 a pound it traded for at its 2007 peak. It is the worst-performing mined commodity this year. Other natural resources such as copper, coal and iron ore have gained year to date. There is plenty to fret about. In the U.S., a market awash with cheap natural gas, nuclear reactors have been closing. A few years ago, France said it would start reducing its reliance on atomic energy. China, while rolling out a broad expansion of its nuclear fleet, has built up inventories of uranium that could last more than a decade. **In Japan**, a long-awaited revival hasn’t happened. The Fukushima Daiichi meltdowns in 2011 sparked protests and the **shutdown of its** fleet of 50-plus **nuclear plants**, and **tarnished uranium’s image globally. The government had planned to restart more than 30 reactors by 2030**, and analysts had expected as many as 10 back online by 2017. Now, it isn’t certain the two reactors that are operating will remain running and that the dozens of other reactors not slated for decommissioning will ever be restarted. “The restart pace is way behind earlier expectations,” said Jonathan Hinze, international executive vice president at Ux Consulting. “As long as the **Japanese reactors** are **sitting idle,** it just **keeps feeding the negative perceptions in the uranium market** **about** the **demand** side.” A court injunction in March forced Kansai Electric Power Co. to halt its Takahama plant, less than two months after it went online at the beginning of the year. The court said the utility had failed to show that the plant would be safe in the event of a quake or tsunami. The governor of Kagoshima, Satoshi Mitazono, elected three weeks ago, has promised voters to suspend operations at the only other plant in operation, Kyushu Electric Power Co.’s Sendai nuclear plant. He cited heightened fears among residents following the April quakes in the Kumamoto area, which had long been thought to be safe from large tremors. Residents across Japan are seeking court injunctions to prevent restarts elsewhere, including a suit to stop the planned August restart of Shikoku Electric Power Co.’s No.3 reactor at its Ikata plant. In 2010, before **Japan’s mass nuclear-plant closures**, the country’s reactors **account**ed **for** roughly **12% of uranium demanded** by the global nuclear-energy sector, according to the World Nuclear Association, an industry group. The U.S. accounted for 28% and France roughly 15%. **The fate of Japan’s** sidelined **reactors remains an important driver of market sentiment,** producers and analysts say. Unlike commodities such as copper or oil, the uranium market is dominated by a small number of mining companies and utilities, and buyers tend to agree to deals years in advance. That means expectations for future supply and demand can move prices. Mr. Hinze said a global glut in U3O8, a common compound of uranium, is deepening. Annual supplies of about 200 million pounds are well above the 170 million pounds needed each year to feed the world’s operating reactors. Stockpiles have climbed from virtually nothing before the Fukushima disaster to more than 1.4 billion pounds now, Mr. Hinze estimated. In the U.S., five reactors have shut since 2013, and over the past year or so, an additional seven reactors in the U.S. have been slated to close early. Ux Consulting said China already has about 300 million pounds of U3O8 stockpiled, enough to last it years even as it ramps up production of nuclear power. ENLARGE Uranium producers remain upbeat on the eventual prospects for uranium as emerging economies build up their power infrastructure. China has stepped up efforts to introduce cleaner energy and has the world’s largest pipeline of nuclear-power plants. More than 30 reactors have been built in China since the 1990s. There are now another 20 under construction in China, according to the International Atomic Energy Agency. Nuclear-power generation increased by 1.3% in 2015, underpinned by a roughly 30% increase in China’s output, according to a World Nuclear Industry Status Report. Still, annual nuclear electricity generation, at 2,441 net terawatt-hours, was 8.2% below 2006 levels. “Despite the current market challenges, we remain confident in nuclear power,” Canada’s Cameco Corp. said Thursday as it reported a quarterly net loss. Cameco is the world’s No. 2 uranium mining company by market share, behind Kazakhstan state-owned NAC Kazatomprom JSC. Shares in Cameco are down about 26% in 2016. Capital Economics anticipates more new plants will spur a recovery to $35 a pound by the end of 2016 and to $40 a pound by the end of next year. Others remain cautious. Macquarie said in a July 26 note that it “is increasingly difficult to see what drives uranium materially higher from here.” Mr. Hinze said one of the main sources of demand now is from traders who are buying low-cost material for longer-run deals with utilities. “We call this ‘demand stealing from the future’,” he said, “as it’s basically a way of moving future demand into the present.”

### Link – Price Freeze

#### A ban on nuclear power freezes the price rise for uranium and prevents development of a positive approach to uranium --- empirics. STAFFORD 2:

[Stafford, James. “Uranium Prices Set To Double By 2018.” June 14, 2016. <http://oilprice.com/Energy/Energy-General/Uranium-Prices-Set-To-Double-By-2018.html>.// LHP MK]

[Mining Weekly expects](http://www.mining.com/chart-uranium-juniors-defy-bear-market-pricing/) **“the period from 2017-2020 [is] to be a landmark period for the nuclear sector and uranium stocks**, as the global operating nuclear reactor fleet expands.” “**It’s impossible to find another natural resource that is so fundamentally necessary** and yet has carried such negative sentiment as uranium. The market has been skewed by **negative sentiments** that **ignore** the **supply and demand** fundamentals,” says [Paul D. Gray](http://zadarventures.com/), President and CEO of Zadar Ventures Ltd., a North American uranium and lithium explorer. But the toxicity levels have dissipated, and **nuclear energy is rebounding** as a cleaner power source with next generation safeguards. The fundamentals are again ruling the day, and this will be the key year for uranium,” Gray told Oilprice.com. Why Sentiment is Changing: Born in Chernobyl, Raised in Japan The negative sentiment on uranium was largely made in Japan. The 2011 disaster at Fukushima created an irrational disconnect between sentiment and uranium fundamentals. Now that enough time has passed since Fukushima, this negative sentiment is losing steam as it appears that Japan has succeeded in bringing some of its reactors back online – four of its reactors have already restarted operations. So **the world is refocusing on** what are arguably brilliant fundamentals, which actually have been there all along. First and foremost, the world is **building** more **nuclear reactors** right now than ever before, despite Fukushima. A total of **65 new reactors are already going up, another 165 are planned and** yet another **331 proposed. Powering** all of **these** **developments will require an impressive amount of uranium**. Right now, [existing nuclear reactors](http://www.fxnewscall.com/uranium-rally-to-lift-prices-new-demand-exhausting-supply-glut/1941312/) use 174 million pounds of uranium every year. That will increase by a dramatic one-fifth with the new reactors under construction. But in the meantime, uranium producers have reduced output due to market prices and put caps on expansion. As a result, supplies are dwindling. Currently, **the world is increasingly recognizing nuclear energy** as the cheaper, cleaner, and greener option—as indicated by the number of reactors being built. As the specter of nuclear accidents wanes in the aftermath of Fukushima and climate change fears move to the top of the chain, **uranium is set for a global sentiment transformation.**

### Link – Nuclear Power Key

#### Demand for nuclear power is key to uranium prices. MORNING ’12:

[Money Morning. “Uranium Stocks to Benefit From Nuclear Power Resurgence,” 23 Nov 2012, <http://www.marketoracle.co.uk/Article37687.html>]

Don Miller writes: Nuclear power is poised to make a comeback, and the spike in uranium demand it will bring over the next few years will send uranium stocks soaring. While the Fukushima nuclear disaster in Japan in March 2011 stirred a lot of talk about abandoning nuclear power, nations have since come to realize their energy needs can't be met without nuclear being part of the equation. The Japanese blowout scared the public so badly, in fact, that many governments vowed to severely cut back on nuclear power. Germany said it would quit using it altogether. But then reality struck**.** Major export economies in Europe and Asia have energy-intensive industries that can't just dump nuclear energy overnight. The best proof that nuclear is not going away is right in Japan, which already has been forced to restart two reactors, and more will be restarted soon. The Prime Minister of Japan called restarting the reactors a "matter of national survival," because the high cost of imported liquid natural gas was crippling the economy. And nuclear energy has proven itself to be a safe alternative to the smog-belching coal plants in emerging countries like China and India. Even oil-rich countries like Saudi Arabia are building new nuclear reactors now -- a clear sign nuclear energy is here to stay. Simply put, the world not only needs low-cost nuclear power - it needs more, not less of it. And uranium is the only fuel that can possibly give billions of new consumers in energy-starved countries like India and China the power they need. Demand Will Drive Uranium Prices Nuclear power [is] currently provides about 13.5% percent of the world's electricity, and that's likely to grow given the new capacity slated to come online. A total of 31 nations across the globe have 436 nuclear reactors under production. Globally a total of 95 nuclear reactors are planned over the next two decades with 62 already under construction, according to the World Nuclear Association (WNA). And **each of those plants will use 500,000 pounds of refined yellowcake per year**. But miners can't satisfy the world's current appetite for uranium, much less higher demand in the future. The WNA has projected 52,221 tons of production in 2012. Meanwhile, uranium demand is expected clock in at around 77,000 tons. Demand for uranium is expected to jump 7% per year, reaching 110,000 tons by 2017. Altogether, the planet could come up 400 million pounds short by 2020. Still, the cost of uranium production means the industry needs to get about $85 per pound to make it worth bringing new mines into production. But rising demand should take care of that. "When those supply and demand lines intersect, the only thing that can happen is prices go up," noted natural resources expert Rick Rule recently told The Daily Crux. "If the prices don't go up, the lights will go out." Fukushima Creates Uranium Stock Opportunity The Fukushima disaster and all the negative talk that followed sent uranium prices -- and uranium mining stocks -- into a nosedive. Prices for uranium tumbled to about $41 per pound from $68, according to Ux Consulting. Uranium stocks suffered accordingly. The Global X Uranium ETF (NYSEArca: URA), for example, has fallen nearly 23% year-to-date. But for investors today, that decline is an opportunity. Despite what happened at Fukushima, the overwhelming appeal of nuclear energy has set the stage for a rebound**.** It's only a matter of time before the demand for energy in emerging markets will drive a new nuclear boom. And with prices at rock-bottom, it's time to put uranium mining stocks on your radar**.**

#### Nuclear power demand is surging --- key booster for uranium prices. MENDELEVITCH 6/9:

[Mendelevitch, Roman. “Nuclear power and the uranium market: are reserves and resources sufficient?” June 9, 2016. DIW Berlin Roundup. // LHP MK]

The increase of the **use of atomic power** in some emerging economies, in particular South Korea and China, **has revitalized** a discussion regarding the availability of **uranium** resources. Despite the fact that global uranium resources are more than sufficient to supply reactor-related demand for the rest of the century, some **voices in the nuclear community expect a supply shortage** for the upcoming decades, **and** the risk of **prices tippling** in the next 20 years. They argue with delayed construction times, untimely mining expansion and unfavorable market conditions. This Roundup takes a closer look at the arguments of the debate. 1. Future prospects of Nuclear Power The use of atomic power for electricity generation and military purposes requires a natural resource: uranium. The uranium market has for a long time been surveyed quite suspiciously by many companies and governments, as the use of **nuclear power is diffusing from the more advanced industrial countries** to emerging economies, such as China, India, Brazil, and others. In addition to the issue of resource availability (“will there be sufficient uranium for everybody?”), and the role of the **nuclear fuel** cycle, corporate strategies (e.g. vertical integration) as well as future prospects for the nuclear industry, both on the demand and the supply side need to be considered. **Forecasts** of **uranium** supply, **demand** and nuclear power capacity are currently subject to uncertainty. In this context, this Roundup provides an overview of the discussion on the role of the uranium market. The next section introduces the nuclear fuel cycle, followed by a discussion of supply and demand at the global scale. Sections 4 and 5 discuss market structures, the role of long-term contracts and vertical integration; Section 6 presents future scenarios of nuclear fuel demand and supply, followed by a summary given in Section 7. 2. The nuclear fuel process As with other raw materials, uranium has to undergo several stages of processing before it can be used as fuel for nuclear power plants. After mining, the uranium ore needs to be separated from waste material and milled. The resulting intermediate product is referred to as yellow cake (U3O8). This material has yet a low share of uranium-235 (~1%), the fissile isotope of uranium that is required to maintain the fission process. To increase the share of uranium 235 a high-tech enrichment procedure is required. It is preceded by the conversion of yellow cake to uranium hexafluoride (UF6), which is nowadays mostly performed in specialized centrifuges. Commercial conversion services are available at plants in Canada, China, France, Russia, USA, and commercial enrichment services are provided at plants in China, Japan, England, France, Germany, Netherlands, Russia, USA ([WNA 2015c](http://www.world-nuclear.org/uploadedFiles/org/WNA/Publications/Working_Group_Reports/swaps-report-2015.pdf)) (see below Table 2 and Table 3). The by-product from the uranium enrichment is referred to as depleted uranium (DU) or enrichment tails and can be used in various ways: it can be stored as UF6, de-converted back to yellow cake, used to dilute high-enriched uranium (HEU) or re-enriched ([WNA 2015d](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Uranium-Resources/Uranium-and-Depleted-Uranium/)). Continuing the nuclear fuel cycle, enriched UF6 is then transformed into pellets (UO2), the final nuclear fuel, and utilized to generate power. Fuel fabrication is widely distributed, with local plants in many countries where nuclear power is produced. After three to four years of utilization in a typical Light-Water reactor (LWR) [(MIT 2011, 20](https://mitei.mit.edu/system/files/The_Nuclear_Fuel_Cycle-all.pdf)), the fuel rods are considered depleted. The resulting spent nuclear fuel (SNF), which contains about 96% of the original fissionable material, including depleted uranium and plutonium-239, that was created during the fission process, is discharged from the reactor and, in the context of the “open fuel cycle” or “once-through cycle” (top line in Figure 1), transferred to an interim storage. In the last stage of the fuel cycle, the radioactive waste is planned to be stored in a geological repository for long-term disposal. In the short history of the commercialization of nuclear power, this approach has been by far the most prevalent one and still dominates every alternative currently available. Several advancements to this traditional fuel cycle have been developed or are currently in the development stage. The ”partly closed fuel cycle” (top two lines inFigure 1) involves the recovery of the plutonium as well as uranium contained in the SNF by separation from the radioactive waste and the reutilization in a nuclear reactor as mixed oxide (MOX) fuel ([MIT 2011, 11](https://mitei.mit.edu/system/files/The_Nuclear_Fuel_Cycle-all.pdf)). This technology has already been adopted in France, Great Britain and Japan. Although this method of recycling SNF could have an impact on the global uranium demand, this effect has not yet been observed, as only few reactors (35 or 8% of the world’s operating reactors in 2012) employ MOX fuel ([OECD NEA and IAEA 2014](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf), 116). Furthermore, the current reprocessing and reactor technology only allow a limited number of recycles due to the gradual accumulation of undesirable elements, in particular curium, and certain plutonium isotopes, which are not fissionable by thermal neutron spectrum found in LWRs (such as plutonium-240). Back in the 1970s/80s, there used to be a discussion on so-called “fast-breeder reactors” (FBR), which are fast-neutron spectrum reactors that could convert fertile uranium-238 by absorbing neutrons to fissile plutonium-239 faster than they consume the fuel ([MIT 2011](https://mitei.mit.edu/system/files/The_Nuclear_Fuel_Cycle-all.pdf), 27). As depicted in Figure 1, these reactors could be used in the context of the “closed fuel cycle” (note that this term is misleading since radioactive waste is still generated in this procedure and has to be disposed). Depleted uranium from enrichment facilities and SNF (both containing uranium-238) could theoretically be transformed to plutonium-239 and reused in fast reactors. Fast reactor SNF is then reprocessed to recover uranium and plutonium in order to create new fast reactor fuel assemblies with depleted uranium. This process raised hopes that the energy in the fuel would be used more efficiently (the traditional fuel cycle uses less than 1% of the energy value of the mined uranium ([MIT 2011](https://mitei.mit.edu/system/files/The_Nuclear_Fuel_Cycle-all.pdf), 21)), but the fast breeder has not been further developed thus far and it is still highly uneconomic. Therefore, the anticipated drop in demand for uranium stemming from this utilization of uranium is negligible. The most prominent example for an alternative nuclear fuel is thorium, whose resources are estimated to be three times more abundant than uranium ([WNA 2015d](http://www.world-nuclear.org/info/Current-and-Future-Generation/Thorium/)). Despite not being fissile, thorium-232 absorbs neutrons in a reactor to produce uranium-233, which will fission in the reactor. Consequently, it can only be utilized in conjunction with a fissile material that provides neutrons, such as uranium-233, uranium-235 or plutonium-239, and therefore does not represent a real alternative to conventional uranium fuel, and it is far from commercial utilization as well ([WNA 2015d](http://www.world-nuclear.org/info/Current-and-Future-Generation/Thorium/)). Figure 1: Alternative nuclear fuel cycles. Source: Own illustration based on MIT ([2011, 11](https://mitei.mit.edu/system/files/The_Nuclear_Fuel_Cycle-all.pdf)). Major proliferation concerns have been raised based on this scientific progress, since the modern fuel cycles provide (two lower lines of Figure 1) routes to nuclear weapon materials by extracting plutonium-239, which is predominantly used in nuclear weapons. Therefore, strong incentives exist to adopt fuel cycles that minimize the quantity of weapons-usable material. 3. Current Supply and Demand 3.1 Demand Demand for uranium is primarily driven by installed nuclear capacity and military uses (much of which is confidential). Contrary to other sectors, where metals can be substituted (e.g. aluminum or steel to be used in construction), **the atomic sector heavily relies on uranium** due to limited alternatives. **Demand estimates are complicated by the choice of fuel cycle technology of a country or firm;** in case of a once-through fuel cycle, demand is proportional to the electricity produced. Until the turn of the century, **demand has been increasing,** but has stabilized since (see Figure 2). In 2012, global reactor-related uranium requirements (defined as anticipated acquisitions, not necessarily consumption ([OECD NEA and IAEA 2014, 98](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf))) amounted to 61.6 ktU (with the U.S., France, China, Korea and Russia covering about 70%), **supplying a total of 437 commercial nuclear reactors** (371.8 GWe) **in 30 countries** ([OECD NEA and IAEA 2014](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)). 81% of the world’s nuclear electricity (303.0 GWe) was produced in 18 OECD countries. Further 68 reactors (64 GWe) were under construction. Uranium reactor-related requirements have almost doubled in the Middle East, Central and Southern Asia regions, due to some new reactors, from 0.9 ktU in 2012 to 1.6 ktU in 2013. Figure 2: Uranium demand and primary production from 1970 to 2014. Source: Own illustration based on OECD NEA ([2006, sec. Appendix 7.1](http://www.oecd-nea.org/ndd/pubs/2006/6096-40-years-uranium.pdf)), and OECD 2004-2014. 3.2 Supply and Resources In nature, uranium does not appear in its pure form, but in combination with other elements as uranium ores. Production methods include open-pit mining (20%) and underground mining (26%), and in situ leaching (ISL, 45%), it is also extracted as a co-product or by-product in gold, copper and phosphate production (7%) and others (2%) ([OECD NEA and IAEA 2014, 69](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)). Reported uranium resources are subject to uncertainty since new resources are continuously identified due to exploration activities. They are classified into different categories, according to the degree of confidence in the respective estimated uranium resource. China’s total uranium resources, for example, are expected to substantially increase in the near future due to high investment in exploration activities: In 2012, China spent $131 million (more than 14 times as much as in 2003) on uranium exploration, leading to a three-fold increase in identified resources from 77 ktU in 2003 to 266 ktU in 2012 ([Zhang 2015](http://dx.doi.org/10.1177/0096340215581358)). The global distribution of reasonably assured resources (RAR) – highest reliability in estimates, generally compatible with mining decision-making standards – were estimated to be 4.6 MtU in 2012: Australia, the U.S. and Canada currently own the largest share with 1.2 MtU, 0.5 MtU, respectively. ([OECD NEA and IAEA 2014, 21](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)). In fact, only a few countries possess a significant share (>1%) of the global RAR. However, the estimated amount of undiscovered resources that are expected to occur based on geological knowledge is equal to 7.7 MtU ([OECD NEA and IAEA 2014, 33](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)). In terms of actual production, a total of 58.8 ktU was produced in 2012, primarily in Kazakhstan, Canada and Australia with a share of 36%, 15% and 12%, respectively ([OECD NEA and IAEA 2014, 62](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)). Figure 3: Distribution of reasonably assured resources (RAR) among countries with a significant share of resources. Source: Own illustration based on OECD NEA and IAEA ([2014, 21](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)). In addition to the aforementioned resources, referred to as “primary” sources of uranium supply, a significant portion of the global uranium demand has been supplied by “secondary” sources, particularly in the 1990s and the early 2000s (filling the gap between global primary production and demand in Figure 2). These include stocks and inventories of natural and enriched uranium, from civilian as well as military origin, which have been accumulated during times when production exceeded demand (until 1990 c.f. Figure 2). Another uranium resource that does not result from a direct mine output source originates from re-enrichment of depleted uranium tails and reprocessed spent nuclear fuel. Among the secondary resources, the conversion of highly enriched uranium (HEU) from nuclear warheads to low-enriched uranium (LEU), suitable for nuclear power plants, is one of the most significant sources due to its large share (13% to 19% of world reactor requirements until 2013 ([WNA 2014](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Uranium-Resources/Military-Warheads-as-a-Source-of-Nuclear-Fuel/))) as well as its political importance. The process of converting HEU to LEU was primarily stipulated in various agreements between the United States and the Russian Federation such as the “Megatons to Megawatts” agreement ([Centrus Energy Corp. 2015](http://www.centrusenergy.com/russian-contracts/megatons-megawatts)). Under these contracts, both countries agreed to reduce their nuclear arsenal by about 80% ([WNA 2014](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Uranium-Resources/Military-Warheads-as-a-Source-of-Nuclear-Fuel/)). Over the last 20 years, Russia blended down 0.5 kt of its HEU, yielding approximately 14.4 kt of LEU, which is equivalent to about 150 kt of natural uranium or 20,000 warheads. The conversion rate is remarkably high as weapons grade uranium contains over 90% uranium-235. The U.S. committed to the disposition of 0.2 kt of fissile material and has further declared 0.2 t HEU as surplus in 2005 ([OECD NEA and IAEA 2014](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)). With the reduction of the conversion programs, e.g. the expiration of the “Megatons to Megawatts” program, the available secondary resources are likely to diminish ([Zittel, Arnold, and Liebert 2013)](http://risk.boku.ac.at/download/ehnur/EHNUR_WP06_report_final.pdf). In terms of supply of LEU within the International Atomic Energy Agency (IAEA), the IAEA and the Kazakh government agreed to open the first internationally controlled depot of LEU in Oskemen, Kazakhstan ([IAEA 2015](https://www.iaea.org/newscenter/news/iaea-and-kazakhstan-sign-agreement-establish-low-enriched-uranium-bank)). The purpose of this agreement is to supply member states with LEU in case of a shortage on the global uranium market and to hinder countries from acquiring enrichment technology, which would increase the risks of proliferation. The physical reserve should provide capacity to store up to 90 metric tons of LEU. As this amount of LEU would satisfy only a fraction of the global requirements, the impact of such an establishment remains questionable. 4. Contracts and Prices Although **uranium has become one of the key fuels in many industrialized and emerging economies,** a comprehensive body of empirical research examining the market conditions is lacking. This can partly be attributed to several characteristics of the commodity uranium and the uranium market. Trade in uranium is usually stipulated in fixed long-term contracts that are negotiated between uranium mine operators and consuming facilities for a timeframe of up to 10 years or more ([Trieu, Savage, and Dwyer 1994](http://dx.doi.org/10.1016/0301-4215(94)90006-X)). The prices set in the long-term contracts, whose terms are mostly confidential ([OECD NEA and IAEA 2014](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)), can be either fixed throughout the contract duration or variable, orientated towards the spot market price, which fluctuates according to current supply and demand. Only about 20% of all uranium has been sold on the spot market and the remaining 80% under long-term contracts ([Auzans et al. 2014](http://dx.doi.org/10.3390/en7117673)). Furthermore, Owen ([1983](http://dx.doi.org/10.1016/0301-4207(83)90052-1)) finds that the demand for uranium is price inelastic; this can be explained by the nature and function of nuclear reactors. **As uranium is used to produce electricity in plants that feature long construction and operating times, buyers’ highest priority is security of supply. Hence, buyers not only diversify their sources of supply, but they are also willing to pay higher prices for a secure supply of uranium** ([Trieu, Savage, and Dwyer 1994](http://dx.doi.org/10.1016/0301-4215(94)90006-X)). In addition, military stocks made available for civil use modify the demand-supply balance. The fact that there is no substitute to uranium reinforces the singularity of the uranium market. Malischek and Tode ([2015](http://www.ewi.uni-koeln.de/fileadmin/user_upload/Publikationen/Working_Paper/EWI_WP_15_01_Test_Theory_Nonrenewable_Resources.pdf)) find a substantial mark-up over marginal costs exists in the uranium price, which cannot be attributed to scarcity rents. This finding implies that market power is exerted in the uranium market and that pricing mechanisms do not reflect current cost of production. Kahouli ([2011](http://dx.doi.org/10.1016/j.enpol.2010.10.007)) provides an overview of studies analyzing the uranium market. As mentioned above, uranium demand could not be met by primary production since 1990 (see Figure 2); additionally, there has been a large and unexpected decrease in primary supply from Canada and Australia; capacity predominately managed by AREVA was expected to come online but had serious delays due to the company’s financial problems. This development of the relation between demand and supply of uranium resulted in changing market conditions. Kahouli ([2011](http://dx.doi.org/10.1016/j.enpol.2010.10.007)), in line with the papers analyzed in her study, finds that the uranium price is significantly correlated with the coal price but not with oil price. Moreover, she finds that the uranium supply is correlated with the price of by-products like copper and gold. Figure 4 shows the average of uranium prices for spot and long-term contracts for the EU from 1980-2014, both nominal and real (deflating by the German producer price index since 1980 ([Statistisches Bundesamt 2016](https://www.destatis.de/DE/Publikationen/Thematisch/Preise/Erzeugerpreise/ErzeugerpreiseXLS/Erzeugerpreise2170200161045.xls?__blob=publicationFile))). Both the the spot prices and long-term prices in 2014 were significantly below the 1980 values. The drop of prices was particularly strong after 1986, year of the Chernobyl accident, which marked the end of the boom of civil nuclear power in the Western world. In the course of the resource boom after 2004, uranium prices increased quite significantly, with spot prices reflecting the volatility of other natural resources, such as oil. , Between 2006-2011, the price was driven by among others factors, problems in production centers, changes in the value of the US dollar (currency used on the uranium market), speculations and the general market perception concerning the future importance of uranium ([OECD NEA and IAEA 2014](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf),119-124). After 2011, year of the Fukushima nuclear accident, prices dropped again. In 2014, the average uranium price in the EU was 40 USD/lb U3O8 and 38 USD/lb U3O8for multiannual and spot contracts, respectively ([Euratom Supply Agency 2014](http://ec.europa.eu/euratom/observatory_price.html)) Figure 4: Average nominal and real uranium prices for EU spot and long-term contracts 1980-2014. Source: Own illustration based on Euratom Supply Agency ([2014](http://ec.europa.eu/euratom/observatory_price.html)) and Statistisches Bundesamt ([2016](https://www.destatis.de/DE/Publikationen/Thematisch/Preise/Erzeugerpreise/ErzeugerpreiseXLS/Erzeugerpreise2170200161045.xls?__blob=publicationFile)). 5. Corporate Strategies in the Nuclear Fuel Cycle towards more Vertical Integration Although the vast majority of globally traded uranium is processed by only few companies, the global uranium supply chain nevertheless exhibits a high level of complexity. The international companies involved are often joint ventures with many subsidiaries. There is also a discrepancy among the companies in terms of the level of vertical integration. Paladin Energy Ltd, for example, an Australian company, solely dedicates its business area to uranium mining and production, whereas Rosatom, a state corporation in Russia, covers all steps of the nuclear fuel cycle as well as the construction of nuclear power plants. Nevertheless, a tendency towards vertical integration by some international players is currently emerging, particularly in countries pursuing ambitions of nuclear expansion. 5.1. Uranium Mining In total, uranium mines operate in 20 countries, but 85% of the world’s mined uranium is supplied by the six countries included in Table 1. Only 10 mines accounted for more than 54% of the global uranium production in 2014. Table 1: The largest producing uranium mines in 2014. Source: Own illustration based on ([WNA 2015f](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Mining-of-Uranium/Uranium-Mining-Overview/)) 5.2. Conversion The next step of the nuclear fuel cycle involves the conversion of yellow cake to uranium hexafluoride (UF6); commercially operating conversion plants are located in the USA, Canada, France, Russia and China (see Table 2). Several companies such as Cameco, Areva, TVEL (which belongs to Atomenergoprom and is therefore part of the Rosatom State Corporation) are both involved in mining and conversion. Secondary sources of conversion supply has been primarily provided by blending down Russian HEU and amounted to approximately 26 ktU in 2013. Due to the cessation of the Russian HEU supply, these sources are projected to account for less than 14 ktU by 2022. Table 2: World Primary Conversion capacity. Source: Own illustration based on ([WNA 2015a](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Conversion-and-Deconversion/)) 5.3. Uranium Enrichment The technology utilized in the uranium enrichment process is very sensitive and always under international control due to risks of proliferation. In order to mitigate the potential of proliferation as much as possible, the technology is not globally traded: about 90% of the world enrichment capacity is located in the five nuclear weapon states (Table 3). “Separative work units” (SWU) is generally used as a measurement for the capacity of enrichment plants; it is a complex unit indicating the energy input relative to the quantity of processed uranium, the degree to which it is enriched and the level of depletion of the remainder ([WNA 2015e](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Uranium-Enrichment/)). It measures how much of separative work has to be performed in order to enrich a given amount of uranium. In terms of numbers, the production of one kilogram of enriched uranium (5%) requires 7.9 SWU and 10.5 kg of natural uranium, assuming the facility is operated at a tails assay of 0.25%. Reducing the tails assay to 0.2% would require 8.9 SWU to yield the same amount of enriched uranium, but requires only 9.4 kg of natural feed ([WNA 2015e](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Uranium-Enrichment/)). SWU is directly related to the energy consumption in the enrichment process. The enrichment costs are therefore highly dependent on the enrichment method; modern gas centrifuge plants require 50 kWh per SWU, whereas the gaseous diffusion method consumes approximately 2500 kWh per SWU ([WNA 2015e](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Uranium-Enrichment/)).Table 3: World enrichment capacity – operational and planned, (in thousand SWU/yr). Source: Own illustration based on ([WNA 2015e](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Uranium-Enrichment/)) In the last step before uranium can be used as nuclear fuel, it has to be turned into nuclear fuel rods in specialized fuel fabrication plants. In contrast to the universal applicability of some intermediate products of the uranium supply chain such as LEU, nuclear fuel assemblies are highly engineered products, constructed to each facility’s individual specifications. These reach from the physical characteristics of the reactor to its reactor operating and fuel cycle management strategy and even to national licensing requirements ([WNA 2015b](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Fuel-Fabrication/)). It therefore seems logical that most of the main fuel fabricators are also reactor vendors (e.g. Areva, Rosatomprom). The market for LWR fuel, however, is currently changing and becoming more competitive as many fuel types are now manufactured by several competing companies. Moreover, the global fuel fabrication capacity for all types of LWR significantly exceeds the demand (40% of the installed capacity met the demand in 2013) ([WNA 2015b](http://www.world-nuclear.org/info/Nuclear-Fuel-Cycle/Conversion-Enrichment-and-Fabrication/Fuel-Fabrication/)). Since China, India and South Korea are currently aiming at achieving self-sufficiency, thereby contributing to the overcapacity, ample supply will be guaranteed for the foreseeable future. 5.4. Tendencies towards vertical integration Some international players are strongly working towards further vertical integration in their uranium supply chain. The Chinese companies (e.g. CNNC and CGNPG) have pursued a particularly active upstream integration; this includes long-term contracts with mining companies (e.g. Canada’s Cameco and Kazakhstan’s Kazatomprom, and Uzbekistan’s Navoi Mining & Metallury), but also the acquisition of upstream assets (e.g. SinoU activities in Niger, Namibia, Zimbabwe, and Mongolia) in order secure the uranium supply for the projected increase in reactor-related uranium requirements ([Zhang 2015](http://dx.doi.org/10.1177/0096340215581358)). The Canadian company Cameco, which is predominantly focusing on uranium production, is currently exploring opportunities to add uranium enrichment to its uranium production portfolio ([Cameco 2014](http://www.cameco.com/annual_report/2014/mda/our-strategy/)). Kazatomprom, the Kazakh company whose uranium production has surged in the last decade, is planning on integrating uranium conversion to UF6 in its business activities ([Kazatomprom 2015](http://kazatomprom.kz/en/#!/industry/uranium/Uranium-mining)). It has also just recently gained access to enrichment services in 2014. 6. Discussion of future scenarios Zittel, Arnold and Liebert ([2013](http://risk.boku.ac.at/download/ehnur/EHNUR_WP06_report_final.pdf)) examine several supply scenarios provided by various organizations that participate in the global uranium market, such as WNA, Areva and AtomRedMetZoloto (ARMZ) and find that in none of the examined scenarios high growth demand can be met after 2030. The common base for the scenarios are resource and demand figures published by IAEA in 2011. Depending on the scenario, demand is expected to range between 90 ktU – 140 ktU in 2035, while uranium production is estimated between 70 ktU – 110 ktU. The authors conclude that timely development of mining projects is crucial in order to compensate for the predicted decrease in production, which is expected somewhere between the beginning and the middle of the next decade. Generally, these forecasts are subject to high uncertainty due to the dependency on few large deposits or mining projects such as the Olympic Dam in Australia or the Cigar Lake in Canada. Similarly, Liebert and Englert ([2015](http://eeg.tuwien.ac.at/eeg.tuwien.ac.at_pages/events/iewt/iewt2015/uploads/fullpaper/P_256_Liebert_Wolfgang_2-Feb-2015_19:44.pdf)) also doubt that uranium production will reach a sufficient level of output in case of a high demand scenario, and forecast reaching the high price uranium segment (USD 130/kgU by 2035). However, the previous section has indicated that the global market for uranium is relatively relaxed, and that chances are high that it will remain so in the foreseeable future. In particular, the absence of a global nuclear comeback and the continued availability of secondary material indicate a lack of constraints. Consequently, the forecast presented in the newest edition of the IAEA Redbook (2014) show that, with the inclusion of planned or prospective production facilities, primary production capability will easily cover low demand case requirements and will meet most of the high demand case requirements throughout the period until 2035, even without secondary supplies ([OECD NEA and IAEA 2014](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf), 101): a demand of 72 ktU (low demand case) – 121 ktU (high demand case) and a production of 110 ktU is forecasted for 2035. It is worth mentioning that, compared to the scenarios in Zittel, Arnold and Liebert ([2013](http://risk.boku.ac.at/download/ehnur/EHNUR_WP06_report_final.pdf)), the projections are based on less restrictive assumptions: it is presumed that uranium mines produce at near production capability and that all planned and prospective production centers will be implemented. From a historic perspective, mine production is rarely more than 85% of the capability and delays in some mine developments have already been announced due to unfavorable market conditions, e.g. rising mining and development costs as well as low uranium prices. Thus, in order to narrow the gap between the demand and supply in the near future, strong market conditions are vital ([OECD NEA and IAEA 2014](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf), 126). None of the reports puts sufficient long-term uranium supply in question. In fact, OECD NEA and IAEA “Red Book” high case scenario reactor requirements to 2035 would use up less than 40% of the identified resources ([OECD NEA and IAEA 2014](https://www.oecd-nea.org/ndd/pubs/2014/7209-uranium-2014.pdf)). In line with these findings, Rooney et al. ([2013](http://www.econ.cam.ac.uk/dae/repec/cam/pdf/cwpe1319.pdf)), conclude that uranium scarcity is unlikely to be an issue in the first half of this century, even in the case of high demand projections. The same line of argument is brought forwards by Hall and Coleman ([2013](http://pubs.usgs.gov/sir/2012/5239/sir2012-5239.pdf)) that identify potential for shortages in production but do not see a scarcity of uranium resources in the well beyond the middle of the century. The argument is strenghthened if economic and technical obstacles to high-growth nuclear energy are taken into account, such as voiced by the World Nuclear Industry Status Report ([Schneider et al. 2015](http://www.worldnuclearreport.org/IMG/pdf/20151023MSC-WNISR2015-V4-HR.pdf)), McCullough ([2014](http://www.mresearch.com/pdfs/Uranium%20mining%20in%20Quebec.pdf)) or Kemfert et al. ([2015](https://www.diw.de/documents/publikationen/73/diw_01.c.520068.de/diw_econ_bull_2015-47-1.pdf)). 7. Summary The **production of nuclear power is solely dependent on one resource: uranium. It has to undergo various stages along the nuclear fuel cycle** (mining, milling, conversion to UF6, enrichment, fuel fabrication and finally waste disposal), when **utilized for power generation. Uranium resources are concentrated in few locations around the globe, likewise are the facilities providing a nuclear fuel cycle service**. As proliferation risks are always prevailing, the uranium market is under tight international control to impede a dispersal of enrichment technology. The uranium market, therefore, does not exhibit the features of a conventional commodity market: **the demand for uranium**, for instance, **is inelastic to the price as security of supply is the highest priority for buyers**. Furthermore, **market participants follow individual strategies, ranging from an exclusive focus on one step of the fuel cycle to a complete vertical integration of the services required by the nuclear fuel cycle**. Nevertheless, a trend towards vertical integration seems to be emerging. Concerning the issue of uranium scarcity, it has become evident that the current base of uranium resources and reserves satisfies the projected reactor-related requirements for the foreseeable future. Although there might be a certain inertia in uranium production (mine exploration, construction, expansion, etc.), no high scarcity prices are to be expected. The situation will relax even more once current technical and economic obstacles to expanding nuclear power in industrial and emerging countries materialize (cf.[Davis 2012](http://dx.doi.org/10.1257/jep.26.1.49); [Lévêque 2014](http://www.cambridge.org/de/academic/subjects/economics/natural-resource-and-environmental-economics/economics-and-uncertainties-nuclear-power)). Whatever the future of nuclear power may be, resource availability is unlikely to be a determining factor.

### Link / Turns Prolif

#### Turns prolif --- a ban decreases uranium prices which prevents stockpiles from being used for nukes --- history proves. HARACK ’10:

[Ben Harack, 9-5-2010, "Does nuclear power lead to weapons proliferation?," Vision of Earth, http://www.visionofearth.org/featured-articles/does-nuclear-power-lead-to-weapons-proliferation/]

Megatons to Megawatts **Thanks to** this **joint program[s] between the United States and Russia**, hundreds of **tons of highly enriched uranium has been** down-blended and **used in** United States **nuclear reactors as fuel. This program has turned a huge amount of weapons-grade material into both useful energy and resulting material that is no longer easily used for weapons. Programs such as these are a crucial [to] part of the nuclear disarmament of the world. Since much of the world uses uranium as an electricity source, it is guaranteed that the market price remains relatively high**. A **high market price encourages** the dismantling of nuclear weapons and the **safekeeping of the uranium stockpiles** not just because they are dangerous but **because they are incredibly valuable**. It has been noted that **without this program it is likely that the Russian stockpiles would not have been as well-cared-for in the time following the downfall of the Soviet Union**.

## Impact Module

### Impact Module – Central Asia

#### Increased uranium price and nuclear power is key to Kazakhstan economic stability. VERGNAUD ’16:

[Vergnaud, Lara. “Can uranium save Kazakhstan?” Blouin News, 20 Jan 2016, <http://tinyurl.com/hkpcmet>.]

Unlike most energy exporters, **Kazakhstan is not** dangerously over-**dependent on fossil fuel prices.** **Being the world’s largest producer of uranium gives the country’s economy a major lifeline,** especially **as global demand for nuclear power is on the rise in a carbon-limited future**. On Monday the national atomic company Kazatomprom said that it had increased uranium production from 22.8 million tons in 2014 to 23.8 million tons in 2015. That rise was not in response to the short-term fluctuations of the uranium price on the global market, which stayed between $35 and $40/pound for all of last year. **The price of uranium had been on the way up** (reaching $65/pound) **until the Fukushima** disaster hit Japan in March 2011, at which point it began a steady decline to about $28/pound in mid-2014. **Since then it has recovered** to the present price range, **but Kazakhstan is anticipating a future rise that will prove durable**. Nuclear power generates about 11% of the world’s electricity, but after the Paris climate deal and countries’ earlier pledges to build more reactors, that percentage will grow. China plans to build 6-8 nuclear power plants annually for the next five years, and India aims to generate 25% of its electricity from nuclear by 2050, up from 4% in 2013. (Even Japan intends to restart several nuclear reactors, perhaps paving the way for a return to its pre-Fukushima level of 30% of electricity provided by nuclear power.) Both **Bank of America-Merrill Lynch (BofA-ML) and BMO Capital have forecasted that uranium prices will rise** to test $60 a pound by 2018. And BofA-ML predicted that uranium consumption — which reached 150 million pounds in 2015 — will rise to almost 200 million pounds by 2020. Currently there is a global surplus of 20-27 million pounds, so uranium reactors aren’t going to run out of fuel anytime soon. But even with increased production from Kazakhstan (and potentially Canada, Australia, and lesser producers), analysts estimate the surplus will only be 7.5-10 million tons by 2020. And the recent agreements Kazakhstan has signed will make it even more indispensable on the global level. In December, Kazatomprom and China General Nuclear Power deepened their existing cooperation with a new agreement for the design and construction of a fuel assembly production plant in Kazakhstan and the joint development of uranium deposits in the country. Additionally, last July **Kazakhstan signed a deal to supply India with 5,000 tons of uranium through 2019, beginning this year**. (This will be a significant increase from the first contract that expired in 2014 and entailed Kazakhstan supplying 2,100 tons.)

#### Kazakh economic stability key to Central Asian stability --- checks back terror and competition. TELEKI ’15:

Margarita Assenova the Director of the Institute for New Democracies at CSIS // Natalie Zajicova the Program Officer // Janusz Bugajski the CSIS NEDP Director // Ilona Teleki the Deputy Director and Fellow at CSIS // Besian Bocka the Program Coordinator and Research Assistant at CSIS [“Kazakhstan’s Strategic Significance,” CSIS Institute for New Democracies, <http://eurodialogue.org/Kazakhstan-Strategic-Significance>. No Date, but makes citations from 2015.]

The decision by the Organization for Security and Cooperation in Europe (OSCE) to award Kazakhstan the chairmanship of the organization for 2010 underscores a growing recognition of the country’s regional and continental importance. **Kazakhstan is a strategic linchpin in the vast Central Asian-**Caspian Basin zone, a region rich in energy resources and a potential gateway for commerce and communications between Europe and Asia. However, it is also an area that faces an assortment of troubling security challenges. Ensuring a stable and secure Central Asia is important for the international interests of the United States and its European allies for several prescient reasons: • Asian Security: **Because of its proximity to Russia, China, Iran, and the South Asian sub-continent, Kazakhstan’s security and stability is an increasingly vital interest to all major powers**. Kazakhstan’s tenure as chair of the OSCE will become an opportunity for greater multilateral cooperation in achieving this objective while strengthening the role and prestige of the OSCE throughout Central Asia. • Afghanistan: Central Asia is a key staging area for U.S. and NATO military operations in Afghanistan against Taliban insurgents and Al Qaeda militants. Central Asia is a crucial conduit for U.S. and NATO troops and supplies into Afghanistan. U.S. offi cials recently reached new agreements with Russia, Kazakhstan, and other Central Asian countries to allow Afghanbound non-military supplies through their territories. • Trans-National Terrorism: The **Taliban resurgence** in Afghanistan **stimulates** cross-border **terrorism that may endanger the stability of several Central Asian** neighbors and undermine Western interests. Central Asian states have been the victims of Afghanistan-based transnational terrorism. These states, including Kazakhstan, can support international efforts to counter regional terrorist networks. • Organized Crime and Drug Traffi cking: Central Asia is an important transit region for narcotics traffi cking between Afghanistan and the countries of Europe and Asia. Joint initiatives that will enable the Kazakh government to control and monitor borders more effectively, intercept smuggling operations, and eradicate criminal networks will buttress international security and curtail funding to cross-border terrorist groups. • Energy Security: Central Asia has the potential to be a vital energy source for Europe. The region contains a vast storehouse of oil and natural gas, which Europe urgently needs in order to lessen its reliance on Russian and Middle Eastern energy supplies. Disputes between Russia and several energy transit states, such as Ukraine, have increased Europe’s interest in developing direct supply lines between Europe and the Caspian countries. Challenges to International Interests Despite the strategic significance of Central Asia and the Caspian Basin, in recent years Western countries have not paid sufficient attention to the region. This is due to a combination of factors, including the absence of a shared strategic framework for helping to stabilize and develop the heartland of Asia; insufficient focus on consolidating close political ties with key countries in the region through ustained high-level engagement; and opposition on the part of other major powers competing for influence in Central Asia. Many Western experts conclude that Russia’s leaders have sought to use multi-national organizations, Moscow’s political connections and its economic leverage to assert greater control over ex-Soviet neighbors. There are reports that the Central Asian governments were pressured to curtail Western security interests, including limiting its military presence in the region by, for example, urging Uzbekistan and Kyrgyzstan to evict the U.S. military from bases on their territory. Kazakh leaders are supportive of a more effective American and European role in Central Asia to help promote the region’s security and development, but without undermining Astana’s cordial relations with Russia. Kazakhstan’s independent foreign policy helps provide Western access to the region and enhances its position as a vital transport corridor. **Kazakhstan is also a stabilizing factor in the geopolitical competition of the regional powers for access and influence** across Central Asia. With its reinvigorated commitment to securing Afghanistan and stabilizing the wider region, the Obama administration has an ideal opportunity to reach out to key partners such as Kazakhstan and to enhance Astana’s role as a regional stabilizer. Kazakhstan as a Regional Stabilizer Despite having the largest territory and economy in Central Asia, **Kazakhstan** is not a source of insecurity or threat to any of its neighbors. It does not employ territorial, ethnic, economic, or energy instruments to target and undermine any government in the region. On the contrary, Astana **has sought to establish[es] a system of collective security in Eurasia that would avert the emergence of a single dominant power**. Kazakhstan’s “multi-vector” foreign policy, which seeks to pursue cooperative relations with all major powers, leads Astana to resist any hegemonic ambitions by larger countries that would undercut Kazakhstan’s political or economic independence. While it is a member of the Commonwealth of Independent States (CIS), the Collective Security Treaty Organization (CSTO), and the Shanghai Cooperation Organization (SCO), Kazakhstan has sought to diversify its security relations and keep its freedom to establish and maintain international partnerships. Indeed, Astana has developed productive contacts with NATO by participating in NATO’s Euro-Atlantic Partnership Council (EAPC) and its Partnership for Peace (PfP) program. It was the only Central Asian government to negotiate an Individual Partnership Action Plan (IPAP) with NATO in January 2006. NATO’s June 2004 summit affirmed the growing importance of Central Asia by designating the region as an area of “special focus” and stationing a liaison officer in the Kazakh capital of Astana in order to develop NATO assistance programs to modernize national military structures. A NATO Secretary General Special Representative for the Caucasus and Central Asia was also appointed. Astana has underscored that neither the CSTO nor the SCO should become exclusive military alliances or anti-Western blocs that would challenge NATO’s mission in the wider region. Kazakhstan supports NATO operations in Afghanistan and grants overflight rights to U.S. and other NATO warplanes transporting non-lethal cargo to Afghanistan, as well as emergency landing rights for U.S. military aircraft in the Kazakh city of Almaty. The Kazakh authorities are also developing a Peacekeeping Battalion (KAZBAT), which is slated to become fully operational by 2011 and potentially available for international peace stability missions. Kazakhstan is the only Central Asian country to have an Action Plan to assist in the reconstruction process in Afghanistan, including granting more than $3 million in the 2007-2008 fiscal year for social and infrastructure projects, humanitarian aid, and training for Afghan law enforcement and border patrol officers. For 2009-2011, Kazakhstan has committed an additional $5 million to improve the water supply and distribution infrastructure for shipments of grain and other commodities. Kazakhstan also provides funding to support U.S. objectives in the region. Astana is the only regional donor giving significant aid to Kyrgyzstan, Tajikistan, and Afghanistan. According to the U.S. State Department’s Background note on Kazakhstan, “in 2006, Kazakhstan became the first country to share directly in the cost of a U.S. Government’s foreign assistance program. Through 2009, the Government of Kazakhstan will contribute over $15 million of a $40 million USAID economic development project aimed at strengthening Kazakhstan’s capacity to achieve its development goals.” Kazakhstan has initiated and championed the Conference on Interaction and Confidence-Building in Asia (CICA). Modeled after the OSCE, the CICA process aims to promote peace and security throughout Eurasia through confidence-building measures and other means. The first CICA summit, held in June 2002, was attended by leaders from 16 states who signed the “Almaty Act,” as well as a declaration to eliminate terrorism and promote inter-cultural dialogue. The second CICA summit (hosted by Kazakhstan in June 2006) adopted the Catalogue of Confidence Building Measures (CBM)—a road map for implementing the CBM on a bilateral and multilateral basis. At the last CICA working meeting in India in February 2009, the participating states selected Turkey to chair the conference and host the third CICA summit in 2010. The Turkish chairmanship will expand CICA geographically and move it closer to Europe. Multi-National Counter-Terrorism **Kazakhstan has been combating several potential threats to its own stability** and that of its neighbors, including terrorism, drug smuggling, and organized crime. Although Kazakhstan is generally not a source of these maladies, it is a transit country for such illicit activities. Kazakh leaders have been especially concerned about possible terrorist strikes against their country’s energy infrastructure that could affect exports to European and other consumers. To counter terrorist threats, the Kazakh government has supported multilateral efforts in key multilateral organizations to make counter-terrorism an essential ingredient of their security focus. Astana has also assigned troops to the Central Asian Rapid Reaction Force (CARRF), which is designed to defend each country against major terrorist threats. Regional Non-Proliferation KazakhstanwasthefirstformerSovietrepublictoabandon its nuclear arsenal. It closed the largest nuclear weapons test site and has spearheaded regional denuclearization. Kazakh leaders have also made major progress in downgrading nearly all of the country’s highly enriched uranium, thus lessening the opportunities for such material to fall into the hands of foreign governments or terrorist groups. Astana’s non-proliferation initiatives have earned it praise from a number of international leaders. With impetus from Kazakhstan, the Central Asian states have agreed to coordinate their nonproliferation and export control policies, especially to prevent the smuggling of Weapons of Mass Destruction (WMD) and related materials from the former Soviet Union. In September 2006 in Semipalatinsk, a former Soviet nuclear testing site in Kazakhstan, representatives of the five Central Asian states signed a treaty to create a Central Asian Nuclear Weapon Free Zone, which entered into force on March 21, 2009. The signatories pledged not to develop, manufacture, or otherwise acquire nuclear devices or to assist third parties in developing nuclear weapons programs. The treaty further addressed environmental protection as each of the five states share common problems of environmental damage resulting from the production and testing of Soviet nuclear weapons. Counter-Narcotics Trafficking Countering the trafficking of narcotics from Afghanistan through Central Asia is a major security challenge for all countries in the region, as well as an issue of concern for European and Asian states seeking to stabilize Afghanistan. Proceeds from large-scale smuggling finance organized crime and cross-border terrorism. Central Asian states, including Kazakhstan, have been active in joint operations to intercept drug shipments from Afghanistan and are expanding their counter-narcotics agencies to deal more effectively with the threat. The Central Asian Regional Information and Coordination Centre (CARICC), established in Almaty under UN auspices, serves as the main regional communication center for analysis and exchange of information on transnational crime and the coordination of joint operations. The OSCE, which Kazakhstan will chair in 2010, has established the priority of curbing drug and arms smuggling, strengthening border controls to curtail illegal migration, and countering the financing of terrorist and criminal organizations. Energy Security Kazakhstan is a major producer and exporter of crude oil, projected to export three million barrels of oil per day, or 150 million tons per year, by 2015. Kazakhstan also possesses substantial natural gas reserves and some of the world’s largest reserves of uranium. The three energy-rich states of Central Asia (Kazakhstan, Uzbekistan, and Turkmenistan) understand that their political independence and energy security requires diversifying their energy customers and avoiding reliance on any single power or transit route. Currently, Russia is the main transit route for energy exports from Central Asia. Kazakhstan supports building oil and gas pipelines that would channel its energy resources directly to Europe and China. The Kazakh energy industry favors a direct energy connection with Azerbaijan across the Caspian Sea that would help supply the European market. Astana is seeking to diversify its economy and avoid over-dependence on natural resources and energy exports. Until recently, oil and gas revenues have been aggressively used to develop a stronger economic foundation for expansion into new markets. Kazakhstan seeks to attract advanced technologies and modern management practices into its priority economic sectors, including high technology, financial services, and agriculture. However, the current global financial crisis poses considerable challenges to this agenda, not least because of the weaknesses it has exposed in Kazakhstan’s banking and financial services sector. Economic Development **Sustained economic development is a major determinant of long-term regional stability. Kazakhstan has emerged as a successful model of economic development in Central Asia** and the secular Muslim world. It has the largest economy in Central Asia with a Gross Domestic Product (GDP) exceeding the combined total of its four Central Asian neighbors. The government is in the process of negotiating its entry into the World Trade Organization (WTO) and is a leading proponent of deepening economic cooperation in Central Asia and the Caspian region. Kazakh leaders have focused on developing the Euro-Asian Economic Community (EurAsEC), an organization that also involves Belarus, Kazakhstan, Kyrgyzstan, Russia, and Tajikistan. More generally, Kazakhstan has strongly supported deeper economic integration among these states. Nonetheless, Astana opposes over-reliance on any single country because this would undermine Kazakhstan’s independence and integration into the global economy. **In positioning Kazakhstan as a potential economic hub** and the core of a “Eurasian transport corridor,” President Nursultan **Nazarbayev has proposed creating a regional organization**, styled as the Eurasian Economic Union (EEU), **to harness and intensify trans-border cooperation in such areas as water resource management, transportation infrastructure, crisis-response, environmental protection, and region-wide economic development. Such** a process, even without the support of all Central Asian countries, **could be the first steps toward lowering barriers to trade, harmonizing customs, and building closer economic associations. Kazakh** officials contend that closer **economic integration would reduce** regional **tensions, attract greater levels of foreign direct investment, and increase the region’s leverage and competitiveness in the international arena**. Integration has also been fostered by tangible investments and capital flows as Kazakhstan has played a major role in exporting capital to its neighbors.

#### Escalates into Central Asia nuclear conflict --- extinction. ROGER ’11.

Honorary senior fellow, department of politics and international relations, university of Kent at Canterbury and senior fellow in Eurasian military studies, Jamestown Foundation [Roger, “General Makarov Highlights the “Risk” of Nuclear Conflict,” Eurasia Daily Monitor, 6 Dec 2011, <http://tinyurl.com/gruqsue>.]

In the current election season the Russian media has speculated that the Defense Minister Anatoliy Serdyukov may be replaced, possibly by Dmitry Rogozin, Russia’s Ambassador to NATO, which masks deeper anxiety about the future direction of the Armed Forces. The latest rumors also partly reflect uncertainty surrounding how the switch in the ruling tandem may reshuffle the pack in the various ministries, as well as concern about managing complex processes in Russian defense planning. On November 17, **Russia’s Chief of the General Staff**, Army-General Nikolai Makarov, **offered** widely **reported comments on the potential for nuclear conflict erupting close to the country’s borders**. His key observation was controversial, based on estimating that **the potential for armed conflict along the entire Russian periphery had grown** dramatically over the past twenty years (Profil, December 1; Moskovskiy Komsomolets, November 28; Interfax, November 17). During his speech to the Defense Ministry’s Public Council on the progress and challenges facing the effort to reform and modernize Russia’s conventional Armed Forces, Makarov linked the potential for local or regional conflict to escalate into large-scale warfare “possibly even with nuclear weapons.” Many Russian commentators were bewildered by this seemingly “alarmist” perspective. However, they appear to have misconstrued the general’s intention, since he was actually discussing conflict escalation (Interfax, ITAR-TASS, November 17; Moskovskiy Komsomolets, Krasnaya Zvezda, November 18). Makarov’s remarks, particularly in relation to the possible use of nuclear weapons in war, were quickly misinterpreted. Three specific aspects of the context in which Russia’s most senior military officer addressed the issue of a potential risk of nuclear conflict may serve to necessitate wider dialogue about the dangers of escalation. There is little in his actual assertion about the role of nuclear weapons in Russian security policy that would suggest Moscow has revised this; in fact, Makarov stated that this policy is outlined in the 2010 Military Doctrine, though he understandably made no mention of its classified addendum on nuclear issues (Kommersant, November 18). Russian media coverage was largely dismissive of Makarov’s observations, focusing on the idea that he may have represented the country as being surrounded by enemies. According to Kommersant, claiming to have seen the materials used during his presentation, armed confrontation with the West could occur partly based on the “anti-Russian policy” pursued by the Baltic States and Georgia, which may equally undermine Moscow’s future relations with NATO. Military **conflict may erupt in Central Asia, caused by instability in Afghanistan or Pakistan; or western intervention against a nuclear Iran or North Korea; energy competition in the Arctic or foreign inspired “color revolutions” similar to the Arab Spring** and the creation of a European Ballistic Missile Defense (BMD) system that could undermine Russia’s strategic nuclear deterrence also featured in this assessment of the strategic environment (Kommersant, November 18). Since the reform of Russia’s conventional Armed Forces began in late 2008, Makarov has consistently promoted adopting network-centric capabilities to facilitate the transformation of the military and develop modern approaches to warfare. Keen to displace traditional Russian approaches to warfare, and harness military assets in a fully integrated network, Makarov possibly more than any senior Russian officer appreciates that the means and methods of modern warfare have changed and are continuing to change (Zavtra, November 23; Interfax, November 17). The contours of this evolving and unpredictable strategic environment, with the distinctions between war and peace often blurred, interface precisely in the general’s expression of concern about nuclear conflict: highlighting the risk of escalation. However, such potential **escalation is linked to the reduced time involved in other actors deciding to intervene in a local crisis as well as the presence of network-centric approaches** among western militaries and being developed by China and Russia. From Moscow’s perspective, **NATO “out of area operations” from Kosovo to Libya blur the traditional red lines in escalation**; further complicated if any power wishes to pursue intervention in complex cases such as Syria. Potential escalation resulting from local conflict, following a series of unpredictable second and third order consequences, makes Makarov’s comments seem more understandable; it is not so much a portrayal of Russia surrounded by “enemies,” as a recognition that, **with weak conventional Armed Forces, in certain crises Moscow may have few options** at its disposal (Interfax, November 17). There is also the added complication of a possibly messy aftermath of the US and NATO drawdown from Afghanistan and signs that the Russian General Staff takes Central Asian security much more seriously in this regard. The General Staff cannot know whether the threat environment in the region may suddenly change. Makarov knows the rather limited conventional military power Russia currently possesses, **which may compel early nuclear first use likely involving sub-strategic weapons, in an effort to “de-escalate”** an escalating conflict close to Russia’s borders. Moscow no longer primarily fears a theoretical threat of facing large armies on its western or eastern strategic axes; instead the information-era reality is that smaller-scale intervention in areas vital to its strategic interests may bring the country face-to-face with a network-centric adversary capable of rapidly exploiting its conventional weaknesses. As Russia plays catch-up in this technological and revolutionary shift in modern warfare capabilities, the age-old problem confronts the General Staff: the fastest to act is the victor (See EDM, December 1). Consequently, Makarov once again criticized the domestic defense industry for offering the military inferior quality weapons systems. Yet, as speed and harnessing C4ISR (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance) become increasingly decisive factors in modern warfare, the risks for conflict escalation demand careful attention—especially when the disparate actors possess varied capabilities. Unlike other nuclear powers, Russia has to consider the proximity of several nuclear actors close to its borders. In the coming decade and beyond, Moscow may pursue dialogue with other nuclear actors on the nature of conflict escalation and de-escalation. However, **with a multitude of variables at play ranging from BMD, US Global Strike capabilities, uncertainty surrounding the “reset”** and the emergence of an expanded nuclear club, and several potential sources of instability and conflict, **any dialogue must consider escalation** in its widest possible context. Makarov’s message during his presentation, as far as the nuclear issue is concerned, was therefore a much tougher bone than the old dogs of the Cold War would wish to chew on.

### A2 Central Asia War Good

#### Even a small-scale Central Asian conflict would cause hundreds of millions of deaths. HUGHES ’06:

[Mark W. Hughes, “Is China Preparing for War?,” Thursday, February 16, 2006, pg. http://peakoil.blogspot.com/2006/02/is-china-preparing-for-war.html#comments]

Should China invade without a nuclear first-strike, then Russia would likely not respond with nuclear weapons, at least not initially. However, if nations armed with such weapons go to war, then the potential for a nuclear war always exists. Moreover, once one side sees that it is clearly loosing, and if the stakes are high for each nation, then there is a strong possibility that the losing side will attempt to gain some advantage by utilizing nuclear weapons on the battlefield. Once a war has gone nuclear, escalation is almost inevitable, as the other side retaliates, and the targets of the nuclear exchanges become more significant until a full-scale nuclear war in which populations of the largest cities will likely be targeted and killed. **The implications of even a small-scale nuclear exchange** (to the extent a nuclear exchange can be small-scale) **in Central Eurasia are staggering**. The death toll would be in the millions and the region would be poisoned with radiation and fallout. Since China lacks the massive nuclear arsenal of Russia, even a full-scale nuclear exchange would not quite be the global doomsday scenario that would arise from a U.S.-Russian exchange, since the total number of nuclear detonations would be barely more than half of the doomsday scenario and would be restricted to a much more narrow targeting area. **But the war would take place in the most populated part of the entire world, Central Eurasia, and where a huge amount of global resources are found. The radiation and fallout would affect other large parts of the world, and the death toll from the initial nuclear detonations combined with those suffering radiation sickness and long-term related illnesses would no doubt be in the hundreds of millions.** And of course, **the political and economic impacts would be earth-shattering**, especially in light of the scenarios leading up to the war and if North Korea were enlisted to attack South Korea at the same time. China would have to be willing to gamble that the war would not turn nuclear, unless they devised a way to take out Moscow without any danger of being detected. Most likely, China will bet on keeping the war conventional and hope that surprise and a quick victory will make the operation a success before events spiral out of control. They might also count on Europe and the U.S. pressuring Russia not to respond with nuclear weapons. Ultimately, **the realities of peak oil and the survival of China's current government combine to leave China with little choice but to place their bets and face the risk of the conflict becoming nuclear**