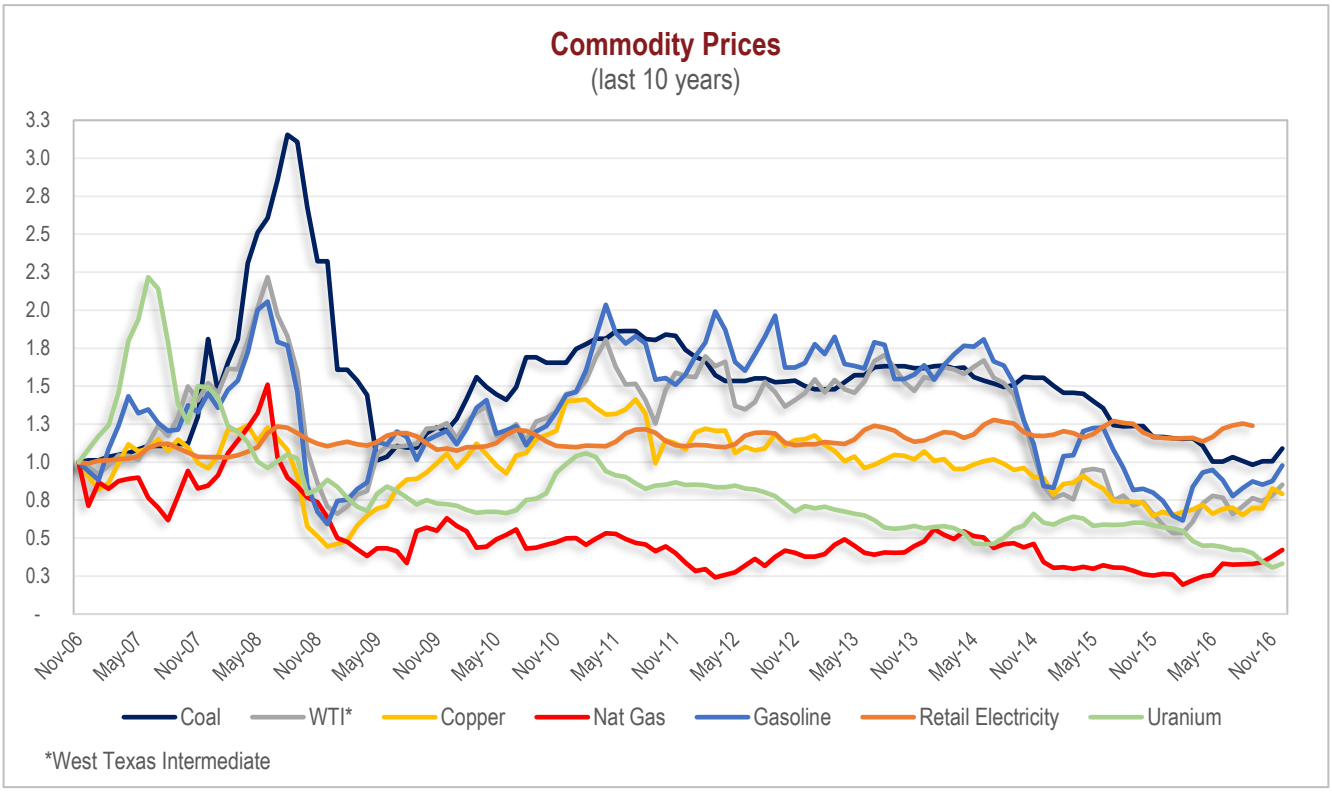
KOPERNIK PERSPECTIVE

Are Uranium Stocks Radioactive?

Natural resources and the companies that produce them have had quite wild rides over the last few years. Excessive optimism about demand growth resulted in huge capacity increases in everything from oil to coal to iron ore. As was inevitable (though still apparently a complete surprise to most) those markets crashed when demand proved to be less rosy than expected. While recently many commodities (particularly coking coal and oil) have rallied hard off of their bottoms earlier last year, a couple remain at multi year lows.

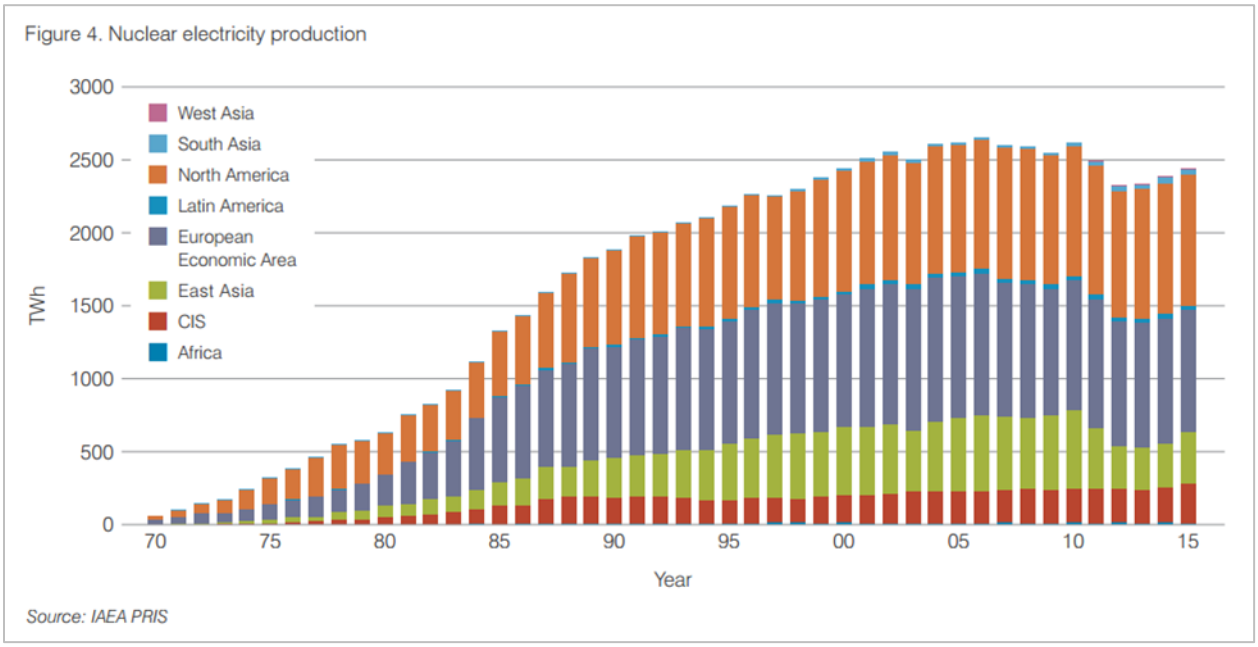
As the chart below shows, uranium and U.S. natural gas prices remain severely depressed. The low gas price is due to the massive success in unlocking new reserves through fracking shale resources, a story that, while interesting, is for another day. What we would like to bring to your attention is the spot price of uranium which continues to languish 60% below its level ten years ago and 85% below its highs.



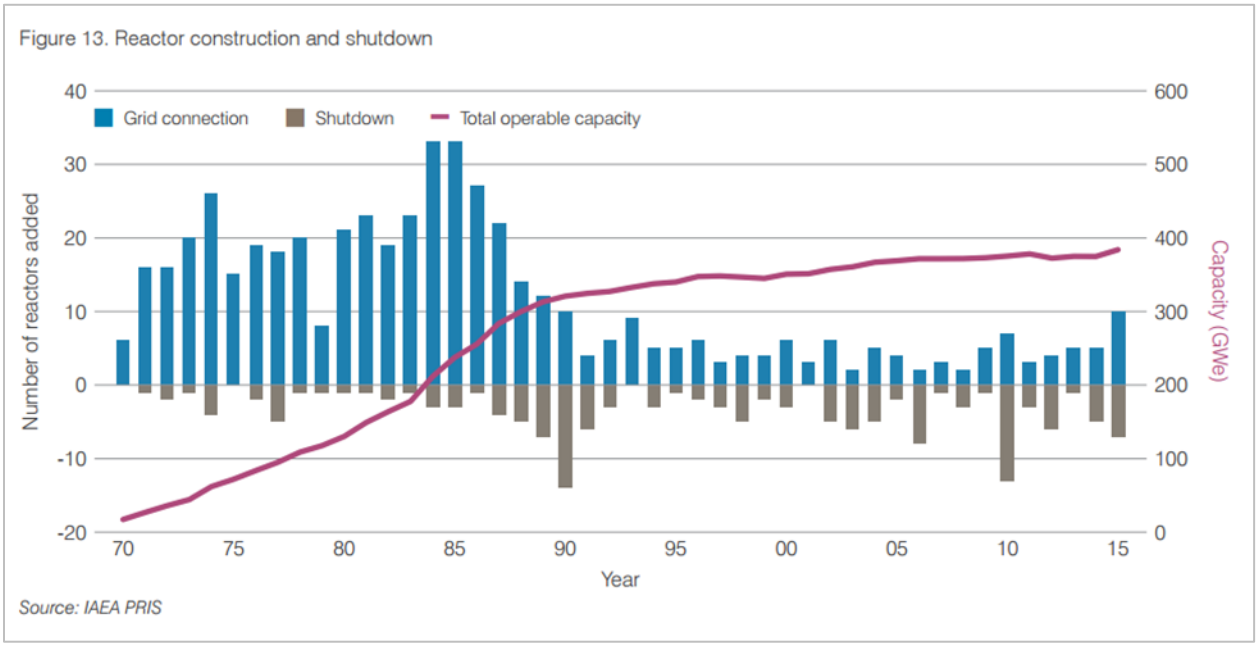
Source: Bloomberg

If the market is correct (something we at Kopernik don't often assume), uranium, and by extension nuclear power, must have some of the worst prospects of all of the various energy sources. So at a time when headlines trumpet the "end of the fossil fuel era", "peak oil demand" and the shift to "carbon free" energy systems, we are supposed to think that the industry hurt worst from all of these potential disruptions is nuclear power? It should come as no surprise to people who know us that we would seek evidence to substantiate and refute this.

Nuclear power currently supplies about 4.4% (BP Statistical Review of World Energy) of the world's energy needs and 10% of electricity generation (World Nuclear Association 2016 Industry report). However this market share understates how important nuclear power is in countries where it is actually part of the mix. For example nukes make up nearly 80% of generation in France, 20% in the U.S. and 15-40% in countries such as Spain, Sweden, Canada, the UK, Korea and Russia. Furthermore, it is usually the cheapest source of energy in these countries.



Nuclear generators operate in 30 countries, although six countries account for approximately 75% of all generators (U.S., France, Russia, China, Korea and Japan, when the latter returns to the market). There are currently 447 operable nuclear reactors in the world with another 59 under construction and about 160 in various planning stages.



With than much growth in the pipeline it would seem that this should bode well for uranium demand. However we also need to take into account retirements as most nuclear plants are over 30 years old and some will be retired rather than spend the money to extend their lives for another 20-30 years. For example Germany shut down prematurely nine reactors after the Fukushima disaster and has plans to retire their last eight there over the next few years. In Japan five reactors at Fukushima were permanently shut down and there will probably be at least another 10 that never restart.

Overall nuclear power and demand for uranium globally is likely to grow about 25-30% over the next ten years, even with the retirements in Germany and only part of Japan's 50 reactors coming back on line. While this only amounts to 2.5% per year growth, we find it hard, absent another Fukushima type incident, to define a plausible scenario in which demand declines over that time frame. We feel it will likely remain the lowest cost source of electricity for at least the next ten years and increasingly attractive as a zero carbon emitting technology. These estimates do not assume any of the previously mentioned 160 planned reactors come on line in the next ten years as long construction times and permitting processes could push these out beyond this time frame.

At this time we feel we should point out the effect that the Fukushima tsunami and nuclear plant disaster has had on the industry. After the tsunami, Japan shut down all its reactors pending further inspections and safety improvements. So far only three out of fifty have returned to work with 30 or so more likely to return over the next few years. Germany also shut down half of its reactors. With 10% of the world's reactors shut down, this had an obvious negative effect on uranium demand, despite much of it being bought with long term contracts.

Could fears over another Fukushima cause more nuclear power plants to close early? It's possible, although it looks like most of the damage is done on this front. The momentum on this seems to be shifting as several countries that initially looked like they might follow Germany's lead have decided to let their reactors operate at least through the end of their permitted lives. There is also a decent chance that shutdowns might not happen as fast, even in Germany, as they are just starting to realize the high costs of doing so and are struggling to replace the power with low cost, low carbon energy sources. Even environmental organizations like the Sierra Club have recently been softening their resistance to nuclear power (WSJ 6/16/16).

This is not to say that there will not continue to be push back on the use of nuclear energy. Nuclear accidents, waste and radiation poisoning have held a particularly terrifying place in the imaginations of doomsayers for many years now. For example the Three Mile Island accident in 1979 launched the "No Nukes" concerts (crappy album by the way, great artists playing their worst songs) and massive protest marches. Yet three years before, a failure of a hydroelectric dam in China killed 171,000 people, triggering no protests or Jackson Brown concerts. Despite its reputation, nuclear power has proven to be quite safe, especially compared to most of the other energy sources. Below is a table of mortality estimates (data collected from the WHO, CDC and National Academy of Science by James Conca) for different electricity sources. These are subject to quite a bit of uncertainty as they incorporate estimates of deaths from pollution as well as accidents. However these would have to be off by orders of magnitude to not show nuclear power as safe.

	Deaths/Trillion kWhr
Coal - Global Average	100,000
Coal - China	170,000
Coal - U.S.	10,000
Oil	36,000
Natural Gas	4,000
Biofuel/Biomass	24,000
Solar (rooftop)	440
Wind	150
Hydro - Global Average	1,400
Hydro - U.S.	0.01
Nuclear - Global Average	90
Nuclear - U.S.	0.01

We don't think this kind of data will change the minds of regulators in Europe or the U.S. to encourage more nuclear power construction. However in emerging markets governments' eyes are wide open and they are going full speed ahead on nuclear. China and India have very aggressive nuclear growth plans and smaller countries from Bangladesh to Belarus are anxious to get their first plants. If new technologies such as low cost Small Modular Reactors ever become feasible, emerging market growth could be even higher.

So if the demand outlook for uranium doesn't look too bad, maybe we just have so much of it available at very low cost that that supply will forever keep prices low. On this front we would disagree.

The uranium market is certainly in an oversupply situation at the moment, the low spot price is enough evidence of that. In addition there is plenty of uranium in the ground around the world, enough to meet demand for over 100 years. However the question is, "at what cost?" As the table below shows the amount of uranium that can be mined at costs around today's prices is less than 10 years' worth of current demand (see rows labelled <USD 40/kgU). Even this overstates how much uranium could be profitably supplied in any one year at current prices as only a handful of mines in Canada and Kazakhstan seem to have costs this low.

Table 1.1. Changes in identified resources (recoverable) 2013-2015

Resource category	2013	2015	Change (1 000 tU)[(a)]	% change
Identified (total) (1 000 tU)				
<USD 260/kgU	7 635.2	7 641.6	6.4	0.1
<USD 130/kgU	5 902.9	5 718.4	-184.5	-3.1
<USD 80/kgU	1 956.7	2 124.7	168.0	8.6
<USD 40/kgU[(b)]	682.9	646.9	-36.0	-5.3
Reasonably assured resources (1 000 tU)				
<USD 260/kgU	4 587.2	4 386.4	-200.8	-4.4
<USD 130/kgU	3 698.9	3 458.4	-240.5	-6.5
<USD 80/kgU	1 211.6	1 223.6	12.0	1.0
<USD 40/kgU(b)	507.4	478.5	-28.9	-5.7
Inferred resources (1 000 tU)				
<USD 260/kgU	3 048.0	3 255.1	207.1	6.8
<USD 130/kgU	2 204.0	2 260.1	56.1	2.5
<USD 80/kgU	745.1	901.1	156.0	20.9
<USD 40/kgU[(b)]	175.5	168.4	-7.1	-4.0

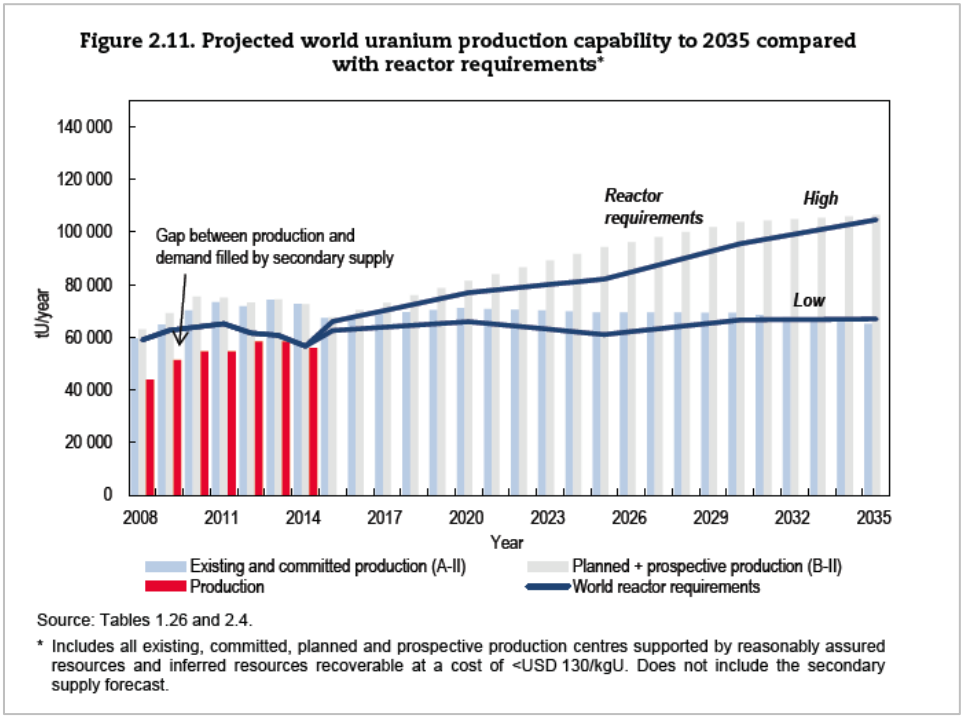
(a) Changes might not equal differences between 2013 and 2015 because of independent rounding.

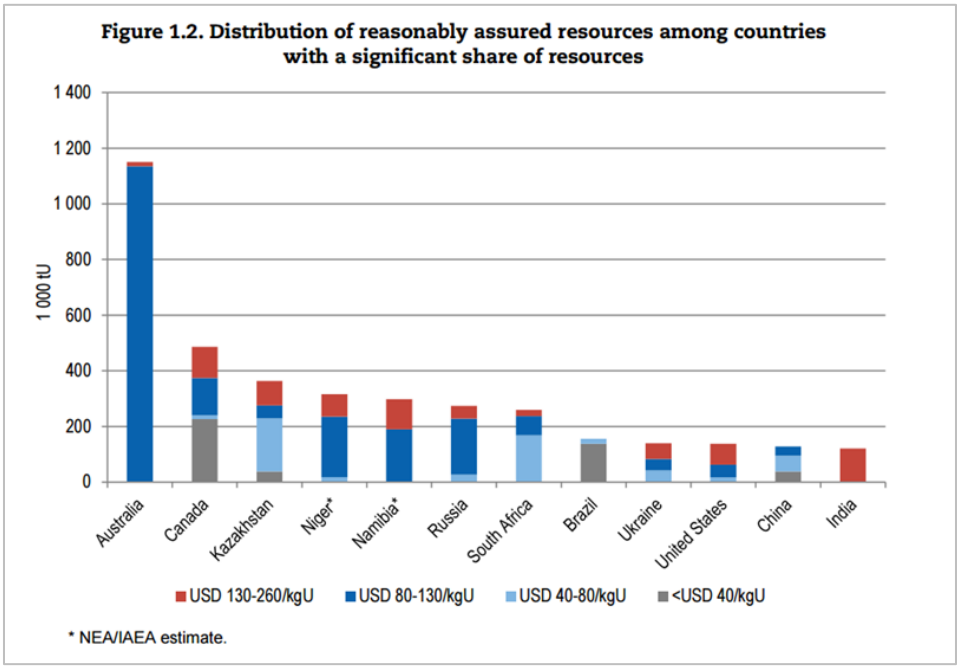
(b) Resources in the cost category of <USD 40/kgU are likely higher than reported, because some countries have indicated that detailed estimates are not available, or the data are confidential.

Source: Nuclear Energy Agency: Uranium 2016: Resources, Production and Demand

The International Atomic Energy Agency ("IAEA") estimates that current uranium production capability at prices under $130/kg (about $50/lb U3O8[1]) is only 67,240 tons per year versus demand of about 72,700 tons. As mines generally produce at about 75-80% of capacity, this leaves over 20% of annual demand to be met by secondary sources (we will return to these in a minute). The IAEA predicts that mine capacity will grow to between 70,000 and 94,000 tons in ten years (assuming prices stay below $130/kg). We believe the low end of this range is more likely since the higher end assumes big production growth out of African and Australian mines which do not look feasible even at $130/kg. If these mines continue to operate at about 75-80% and demand grows as we anticipate, secondary (non-mine) sources of uranium will have to make up between 20% and 40% of supply. In fact even at $100/lb U308 we believe secondary sources would still have to make up a material part of final demand.

[1] U3O8 is uranium oxide concentrate which is what is left after uranium ore is milled and processed. This is the form it is traded in before it goes to enrichment and assembly into fuel rods.





So what is this secondary source of supply that we refer to? It comes from a combination of sales out of inventories (government and commercial), re-enriched tails, underfeed of enrichment facilities and recycled uranium. Most of these are fairly complex and introduce quite a bit of uncertainty to the supply analysis, especially with respect to timing as data from many governments and enrichment plants is scant.

What we can see, however, is that supply from these secondary sources has been declining regularly over the last ten years from 37% to 22% of supply. Through 2013 much of this was from the "megatons to megawatts" program which converted Russian nuclear weapons fuel to low enriched uranium usable for power generation. More recently much of it is from underfeeding enrichment plants which need to stay running despite lower near term demand. As the supply demand dynamic tightens, this pro-cyclical underfeeding is likely to reverse, although the timing of this is uncertain as enrichment capacity remains very high.

One of the reasons that uranium spot prices have fallen so far, despite less than disastrous fundamentals, is that things move very slowly in this business. Generally, most supply is bought by utilities on long term contracts as security of supply is very important to them. This also leaves the spot market less liquid resulting in bigger swings in spot prices. Most uranium mines can still operate profitably today as they are fulfilling previous years' supply commitments at higher prices. This means that the industry has not had the supply reduction that a commodity realizing this kind of price decline would normally have.

There is also very low elasticity of demand for uranium as its cost is a minor (4-5%) part of the total cost of generating electricity. So unlike with natural gas or gasoline where demand rises as the cost goes down, helping to equilibrate the market, uranium buyers do not go out and buy more when it gets cheap. This also means that a rising price will not slow demand growth on the upside of the cycle either.

The uncertainties with respect to secondary supply, timing of Japanese restarts and slow changes in this market makes the timing of any uranium price recovery fairly uncertain. We believe that over the long term the price will need to get to the incentive cost of bringing on new capacity unless we are way off in our demand outlook. This incentive cost is probably in the range of $60-80 per pound of U3O8 and we would not quibble with any estimate within this range. With the current spot price at around $20 we believe there is way more upside than downside in the commodity.

The final piece to consider here is whether the uranium stocks are already discounting an eventual return to higher prices. The answer to this is most likely, partially. The cleanest uranium bet in the stock market is Uranium Participation Corporation (full disclosure, Kopernik has a position in this stock) which is a vehicle for buying and storing uranium. This trades at a small premium to the spot market (5-8%) at the moment. The uranium miners seem to be discounting long term prices in the $30-40/lb. range, which is a material premium to spot but about in line with where long term contracts are likely to get signed near term, and well below the previously mentioned $60-80/lb. price needed to incent new production. At this incentive price there is still quite a bit of upside to the uranium stocks.

If timing is our biggest uncertainty here, it is a risk we don't mind taking. If it takes ten years for the price to recover, our returns of the nuclear power related companies will be mediocre, but not disastrous. If it happens sooner our returns would be quite high. And perhaps just as important, the downside from here seems very limited.

Steve Rosenthal, CFA
Kopernik Global Investors, LLC
February 2017

Important Information and Disclosures

The information presented herein is confidential and proprietary to Kopernik Global Investors, LLC. This material is not to be reproduced in whole or in part or used for any purpose except as authorized by Kopernik Global Investors, LLC. This material is for informational purposes only and should not be regarded as a recommendation or an offer to buy or sell any product or service to which this information may relate.

This letter may contain forward-looking statements. Use of words such was "believe", "intend", "expect", anticipate", "project", "estimate", "predict", "is confident", "has confidence" and similar expressions are intended to identify forward-looking statements. Forward-looking statements are not historical facts and are based on current observations, beliefs, assumptions, expectations, estimates, and projections. Forward-looking statements are not guarantees of future performance and are subject to risks, uncertainties and other factors, some of which are beyond our control and are difficult to predict. As a result, actual results could differ materially from those expressed, implied or forecasted in the forward-looking statements.

Please consider all risks carefully before investing. Investments in a Kopernik Fund are subject to certain risks such as market, investment style, interest rate, deflation, and illiquidity risk. Investments in small and mid-capitalization companies also involve greater risk and portfolio price volatility than investments in larger capitalization stocks. Investing in non-U.S. markets, including emerging and frontier markets, involves certain additional risks, including potential currency fluctuations and controls, restrictions on foreign investments, less governmental supervision and regulation, less liquidity, less disclosure, and the potential for market volatility, expropriation, confiscatory taxation, and social, economic and political instability. Investments in energy and natural resources companies are especially affected by developments in the commodities markets, the supply of and demand for specific resources, raw materials, products and services, the price of oil and gas, exploration and production spending, government regulation, economic conditions, international political developments, energy conservation efforts and the success of exploration projects.

Investing involves risk, including possible loss of principal. There can be no assurance that a fund will achieve its stated objectives. Equity funds are subject generally to market, market sector, market liquidity, issuer, and investment style risks, among other factors, to varying degrees, all of which are more fully described in the fund's prospectus. Investments in foreign securities may underperform and may be more volatile than comparable U.S. securities because of the risks involving foreign economies and markets, foreign political systems, foreign regulatory standards, foreign currencies and taxes. Investments in foreign and emerging markets present additional risks, such as increased volatility and lower trading volume.

The holdings discussed in this piece should not be considered recommendations to purchase or sell a particular security. It should not be assumed that securities bought or sold in the future will be profitable or will equal the performance of the securities in this portfolio. Current and future portfolio holdings are subject to risk.

To determine if a Fund is an appropriate investment for you, carefully consider the Fund's investment objectives, risk factors, charges and expenses before investing. This and other information can be found in the Fund offering materials, which may be obtained by contacting your investment professional or calling Kopernik Fund at 1-855-887-4KGI (4544). Read the offering materials carefully before investing or sending money. Check with your investment professional to determine if a Fund is available for sale within their firm. Not all funds are available for sale at all firms.