ERA.AX, ERA AU
Downgrade to: Neutral
Previous: Overweight
Price: A$1.15

Price Target: A$2.70

PDN.AX, PDN AU
Upgrade to: Overweight
Previous: Neutral
Price: A$1.36

Price Target: A$3.25

Australian Resources

Uranium: Project deferrals likely to see the market in deficit for four years

2011 was a challenging year for the uranium sector, following the incident at the Fukushima power plant. However, 2011 also saw a number of announced delays to uranium project development. We estimate the incentive price for medium-term uranium projects is >50% above the current spot uranium price which will lead to supply being pushed out and the market moving into deficit. On that basis we foresee a tight market for several years and have increased our uranium price forecasts by 5% in 2012, 17% in 2013, and 21% in 2014.

- **Planned production growth is likely to exceed demand forecasts:** We had previously written about the substantial new supply that is planned to come online over the next five to ten years. In aggregate, this new supply exceeds projected demand growth (even before Fukushima). However, there were several announcements of project delays or cancellations in 2011, with the proponents citing unsupportive spot prices. This suggests that supply could take longer to arrive than current projections by the developers.
- **We estimate the incentive price is ~US$80/lb:** We have estimated the incentive prices for 20 greenfield projects that are expected to come online over the next 10 years. These projects represent total capacity of 66kt U_3O_8 versus current global mine production of ~62kt U_3O_8. The analysis indicates that the average incentive price for these projects is ~US$80/lb, versus the current spot price of US$53/lb. We would also note that, of these projects, not one has an incentive price lower than the current spot price.
- **We estimate the market will be in deficit for the next four years:** We have modified our supply/demand forecasts to account for delays and/or cancellations to project development. We have only allowed projects to start if their estimated incentive price is lower than the forecast spot price in year one. The analysis suggests that the market will be in an aggregate deficit over the next four years, implying that spot prices are likely to increase.
- **Higher forecast uranium prices:** We are increasing our 2012 uranium price forecast by 5% to US$63/lb, our 2013 forecast by 17% to US$70/lb, our 2014 forecast by 21% to US$85/lb and our 2015 forecast by 25% to US$70/lb. We have also lifted our 2016-17 price forecasts to US$60-$70/lb.
- **Impact on Australian listed uranium producers:** We are moving to an Overweight on Paladin with a A$3.25 price target as our preferred stock in the sector due to its leverage to commodity prices, open register, and improving operations. Our new ERA price target of A$2.70 per share implies more than 100% upside from the current share price; however, our new rating on the stock is Neutral given a preference for PDN in the sector.

Mining

Mark Busuttil [AC]
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Fraser Jamieson
(61-2) 9220-1586
fraser.jamieson@jpmorgan.com

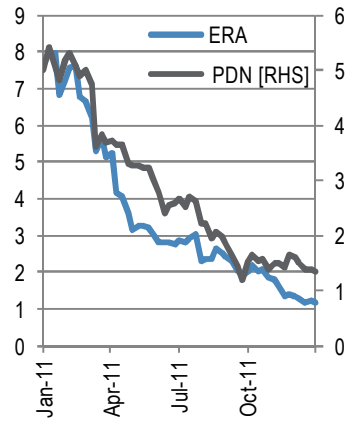
Joseph Kim
(61-2) 9220-7882
joseph.x.kim@jpmorgan.com

Luke Nelson
(61-2) 9220-1629
luke.nelson@jpmorgan.com

Andrew Muir
(61-2) 9220 1579
andrew.x.muir@jpmorgan.com

J.P. Morgan Securities Australia Limited

Figure 1: Stock performance
A$/share



Source: IRESS
Priced at 10 January 2011

Equity Ratings and Price Targets

Company	Symbol	Mkt Cap (A$ mn)	Price (A$)	Rating Cur	Rating Prev	Price Target Cur	Price Target Prev
Energy Resources of Australia Limited	ERA.AX	595.38	1.15	N	OW	2.70	2.60
Paladin Energy Ltd	PDN.AX	1,136.26	1.36	OW	N	3.25	2.55

Source: Company data, Bloomberg, J.P.Morgan estimates. n/c = no change. All prices as of 09 Jan 12.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

J.P.Morgan

Table of Contents

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

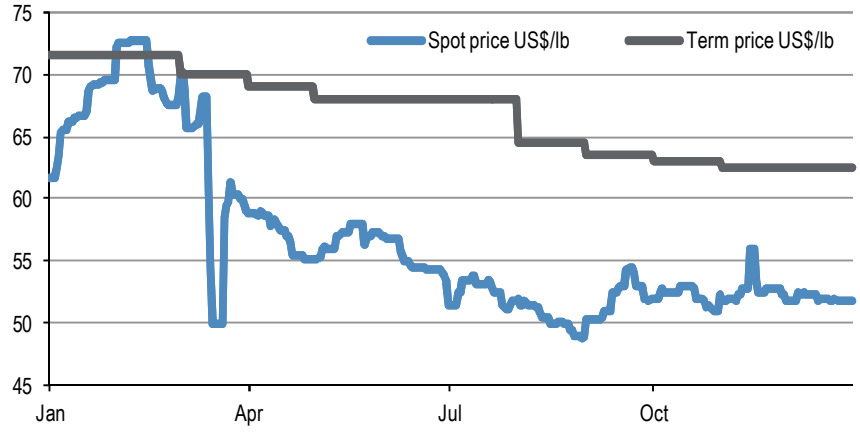
Executive Summary

2011 was certainly a difficult year for the uranium sector with the spot uranium price falling more than 30% following the incident at the Fukushima power plant in Japan in March 2011. However, in the light of rapidly decreasing demand and pricing, we were also able to make a number of key observations about the uranium market:

- **Most countries remain committed to nuclear power:** The significant negative publicity that the nuclear industry faced following Fukushima, resulted in many countries reviewing their nuclear policies. However, the direct impact has been relatively modest with only Germany, Switzerland and Italy phasing out nuclear power. Other countries have introduced stricter safety measures, which have resulted in delays to projected growth in nuclear capacity. Nonetheless, in aggregate, nuclear power forecasts for 2020 have only dropped ~5%.

- **US$50/lb appears to be a floor to prices:** As shown in Figure 2, the uranium spot price twice reached a low of ~US$50/lb in March and August 2011. While we estimate that the market saw a surplus of uranium product in 2011, our analysis of the 2011 cost curve (shown on page 23) indicates that marginal cost of production is ~US$50/lb and that likely acted as a floor to prices during the year.

Figure 2: Uranium prices in 2011



Source: Bloomberg, Cameco

- **Project development is being delayed due to low spot prices:** In 2011, there were several announcements by uranium development companies of project delays or cancellations, with the proponents citing unsupportive spot prices. Some examples of these announcements are:

  - BHP Billiton announced in June 2011 that it had put the Yeelirrie project on hold indefinitely with news reports suggesting that the project had not met the company's internal profitability and safety standards.

  - In June 2011, Mega Uranium flagged delays to the feasibility study of the Lake Maitland project in Western Australia.

  - According to LeMonde in October 2011, Areva is likely to delay the Imouraren uranium mine project.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

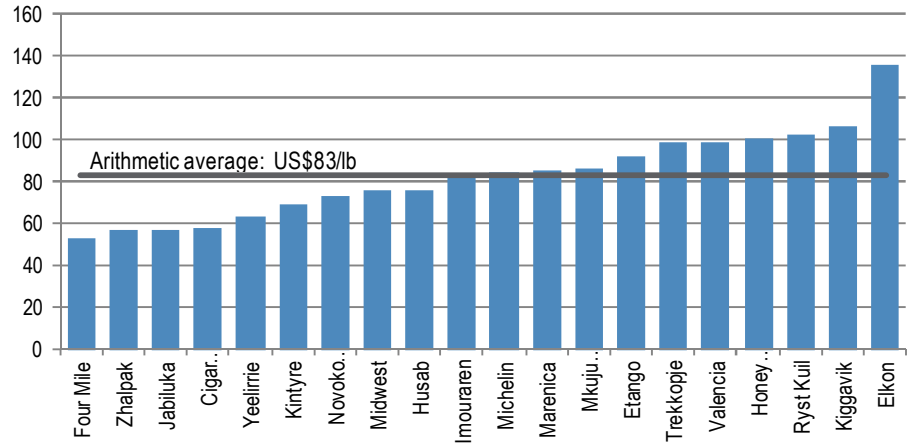
- In October 2011 following a sustained period of lower prices, Sergei Dara, Director of Strategic Development and International Projects at Kazatomprom, said that Kazakhstan has stabilized production to around 20,000 metric tons annually in order to avoid further depressing prices.
- In December 2011, with uranium spot prices in the low US$50's, Areva announced that it was putting its investment in the US$1 billion Trekkopje uranium project on hold.

We had previously written about the substantial new supply that is planned to come online over the next five to 10 years. In aggregate, this new supply exceeds projected demand growth (even before the incident in Japan). However, these anecdotes suggest that supply could take longer to arrive than company projections.

We estimate the incentive price for new supply is ~US$80/lb

Based on industry data, we have estimated the incentive prices required to achieve a 15% nominal rate of return for a selection of 20 greenfield projects. These projects are expected to come online over the next ten years and represent total capacity of ~66kt U_3O_8 (compared to current global mine production of ~62kt U_3O_8). As shown in Figure 3, the analysis indicates that the average incentive price for these projects is ~US$80/lb, 54% above the current spot price of US$53/lb. We would also note that, of these projects, not one has an incentive price lower than the current spot price.

Figure 3: Incentive price analysis

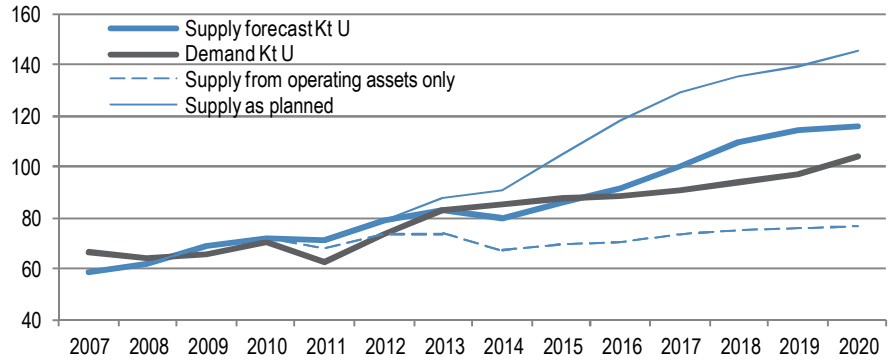


Source: J.P. Morgan estimates.

We have modified our supply/demand forecasts to account for delays and/or cancellations to project development. Generally, we have delayed projects' start dates until the forecast spot price is higher than our estimated incentive price. We discuss each forecast year and the derivation of our price forecasts in more detail from page 22.

Figure 4 shows our supply / demand forecasts to 2020 and how they compare to the "supply as planned" and "supply from operating assets only scenarios". As shown, we forecast a declining surplus of material in 2012 and 2013. However, from 2014 we project a significant deficit as secondary sources diminish. In 2015 and beyond, we see the market more in balance as low-cost, large projects such as Cigar Lake and Olympic Dam come online.

Figure 4: Supply and demand forecasts



Source: World Nuclear Association, J.P. Morgan estimates.

Table 7 below shows our new price forecasts. As shown, we are increasing our 2012 price forecast by 5% to US$63/lb, our 2013 forecast by 17% to US$70/lb, and our 2014 forecast by 21% to US$85/lb. We have also lifted our 2015-2017 price forecasts to US$60-$70/lb.

Table 1: Uranium price forecasts

		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Supply/demand balance															
Surplus / (Deficit)	kt U	-7.5	-3.0	3.2	1.7	8.6	5.5	0.5	-4.9	-1.7	3.3	9.0	15.6	16.5	11.7
New price forecast - REAL															
Spot uranium	US$/lb	97	60	45	46	57	63	70	85	75	70	65	60	60	60
Term uranium	US$/lb	91	83	66	61	67	68	75	90	80	75	70	65	65	65
Old price forecast - REAL															
Spot uranium	US$/lb	97	60	45	46	59	60	60	70	60	60	60	60	60	60
Term uranium	US$/lb	91	83	66	61	67	65	65	75	65	65	65	65	65	65

Source: World Nuclear Association, Bloomberg, Cameco, J.P. Morgan estimates.

Impact on Australian listed uranium stocks under coverage

Paladin Energy – Move to Overweight as preferred sector pick

As expected, the higher commodity price forecasts result in significant upgrades to our earnings forecasts for Paladin. As shown below, our FY2013 and FY2014 NPAT forecasts increase substantially. Our FY2012 NPAT estimate declines due to more conservative uranium price forecasts for the first half of the calendar year.

The changes result in a 19% uplift to our DCF-based valuation.

Table 2: Summary of changes to earnings forecasts - Paladin Energy

US$m	2012			2013			2014		
	New	Old	Change	New	Old	Change	New	Old	Change
Revenue	417	431	-3.3%	585	549	6.7%	722	613	17.7%
EBITDA	94	113	-16.7%	251	213	17.4%	373	266	40.0%
EBIT	56	74	-25.3%	204	167	22.3%	326	220	48.5%
NPAT adjusted	**9**	**23**	**-59.3%**	**115**	**88**	**31.2%**	**203**	**124**	**64.0%**
EPS (US$/shr)	1	3	-59.3%	13	10	31.2%	24	15	64.0%
NPV (A$/shr)	**3.25**	**2.73**	**19.0%**	**3.56**	**2.98**	**19.5%**	**3.83**	**3.21**	**19.2%**

Source: J.P. Morgan estimates.

We are moving to Overweight on Paladin. Our new June 2012 price target of A$3.25 per share is based on our NPV using a 10% discount rate. Refer to our summary financials on page 54. Our positive view is underpinned by:

- **Valuation:** As noted, the changes to our commodity price forecasts have resulted in substantial upside to our valuation. Our new NPV of A$3.25/share implies more than a 100% return from the current stock price. Additionally, as shown in the table below, even excluding the A$0.67/share contribution from the company's suite of exploration assets, we still estimate a valuation of A$2.60/share, ~ 90% above the current stock price.

  Table 3: Paladin valuation

	A$m	A$/share
Langer Heinrich	2,200.4	2.58
Kayelekera	699.0	0.82
Corporate	-224.0	-0.26
Exploration assets	570.3	0.67
Investments	63.9	0.07
Enterprise valuation	**3,309.6**	**3.87**
Net debt	536.5	0.63
Equity valuation	**2,773.1**	**3.25**

  Source: J.P. Morgan estimates.

- **Commodity price momentum:** With uranium spot prices forecast to rise over the next four years, we see commodity price momentum as a fundamental catalyst to drive Paladin's stock price higher. Additionally, we would note that our long-term uranium price forecast of US$60/lb is above the current spot price.
- **Takeover potential:** We believe that Paladin remains one of the most attractive takeover targets in the uranium sector given its low valuation, open register, and operating assets. Following several transactions in 2011, we believe that further consolidation of the uranium sector could act as a positive catalyst for the stock (even if Paladin is not the target).

We believe the key risk to our positive view and the biggest impediment to the stock moving higher is cash flow. Paladin has yet to record positive free cash flow in a reportable period. While noting that this has been in part due to capital and working capital commitments to support growth, we believe that positive cash flow would go a long way to re-assure the investment community.

At this stage we forecast positive cash flow first occurring from the June 2012 half but our positive view largely relies on a turnaround in the company's cash generation. As at September 2011, Paladin had net debt of US$656.8m and gearing of 37%. Total debt was US$815m of which US$50.4m was current. Paladin's current debt facilities are shown in the table below. As shown, total debt available to the company is ~US$1 billion.

Table 4: Available debt facilities

US$ in millions	Maturity	Amount	Comments
Secured bank loan	Current	50.4	US$71m Langer Heinrich project loan facility
Unsecured convertible bonds	2013	317.0	US$325m maturing 11 March 2013 with a coupon of 5.0% and conversion price of US$6.52/shr
Unsecured convertible bonds	2015	260.6	US$300m maturing 5 November 2015 with a coupon of 3.625% and conversion price of US$5.61/shr
Secured bank loan	2015	84.0	US$167m Kayelekera project loan facility
Secured bank loan	2017	103.2	US$141m Langer Heinrich project loan facility
Total		**815.2**	**US$1,004m available**

Source: J.P. Morgan estimates, Company data.

We believe the key event is likely the refinancing of US$325m of convertible bonds maturing in March 2013.

Other risks include:

- **Poor record for meeting production targets:** Paladin has a poor track record of meeting its production targets. Its most recent production report highlighted ongoing issues at both Langer Heinrich and Kayelekera and after one quarter Paladin is already tracking below full year guidance of 7.4-7.9Mlbs. We forecast only 7mlbs of production in FY2012 but we believe achieving production guidance represents a key short-term risk.
- **Negative sentiment towards uranium:** Prior to Fukushima, the nuclear industry had been building a reputation of a clean and safe energy source. The incident in Japan has clearly dampened enthusiasm for the sector. Any further global safety concerns would likely have a material impact on global nuclear power policies and therefore uranium demand, in our view.

Energy Resources of Australia – positive on valuation, but no clear catalysts for some time

Similar to Paladin, the changes to our uranium price forecasts have a material impact on our earnings estimates for ERA. Our CY2011 NPAT estimate increases slightly to a loss of A$47m as we mark-to-market uranium spot prices and FX for the December 2011 quarter. Our CY2012 NPAT estimate also improves to a loss of A$27m and our CY2013 NPAT estimate increases to a profit of A$33m.

Our NPV increases 10% to A$2.71 per share.

We are re-instating our price target and rating following a period of restriction. Our new target of A$2.70 per share implies more than 100% upside from the current share price of A$1.15 per share. However, our new rating is Neutral given a

preference for Paladin in the Australian uranium sector. We note that until the underground is approved (final investment decision is due in 2014) we believe there are fewer catalysts to drive ERA's stock price higher.

Table 5: Summary of changes to earnings forecasts - Energy Resources of Australia

A$m	2011			2012			2013		
	New	Old	Change	New	Old	Change	New	Old	Change
Revenue	601	601	0.0%	611	590	3.7%	615	535	14.8%
EBITDA	70	69	1.3%	204	182	12.5%	232	197	17.9%
EBIT	-55	-55	1.6%	-28	-51	45.1%	58	22	156.7%
NPAT adjusted	**-47**	**-48**	**1.3%**	**-27**	**-42**	**37.6%**	**33**	**8**	**293.4%**
EPS (A$/shr)	-17	-17	0.7%	-5	-8	37.6%	6	2	293.4%
NPV (A$/shr)	**2.71**	**2.46**	**10.0%**	**2.86**	**2.60**	**9.9%**	**3.05**	**2.79**	**9.5%**

Source: J.P. Morgan estimates.

Our new June 2012 price target of A$2.70 per share is based on our NPV using a 10% discount rate. Refer to our summary financials on page 55.

Reasons to be positive on ERA, and upside risks to our rating, include:

- **Valuation:** Clearly the most significant positive is valuation with the stock having declined more than 80% in 2011, and now trading at a P/NPV of 0.45x.
- **Potential for further exploration success:** The Ranger deposit is located in a highly prospective area. The company continues to explore for additional mineralization around the existing open-cut mine and this could further extend the life of the operation beyond the mine lease.

Reasons to be cautious on ERA, and downside risks to our rating, include:

- **Potential for costly rehabilitation:** We have already included substantial rehabilitation costs in our valuation. However, failure to proceed with the Ranger 3 Deeps project could see these payments brought forward.
- **Lack of certainty over the Ranger 3 Deeps project:** As shown below, the final investment decision to proceed on the Ranger 3 Deeps project is not due until 2014. Until that date, the market will likely risk weight the probability of the project proceeding. We estimate that Ranger 3 Deeps represents ~40% of our NPV.

Table 6: Ranger 3 Deeps - indicative milestones

Milestones	Target date
Exploration decline approved (by ERA Board and NT Government)	Completed
Award site preparation work	October 2011
Targeted commencement of draft Environmental Impact Statement and associated studies	2012
Box cut excavation and completion	October 2012
Commencement of decline construction	October 2012
Commencement of drilling	June 2013
Targeted completion of feasibility study	2014
Review of economic viability and decision whether to proceed	2014
Targeted commencement of production	Late 2015

Source: ERA

- **Water management:** While we believe that the company will likely mitigate any further water management issues with the construction of the brine concentrator, significant rainfall could still hamper production and restrict cash flow.

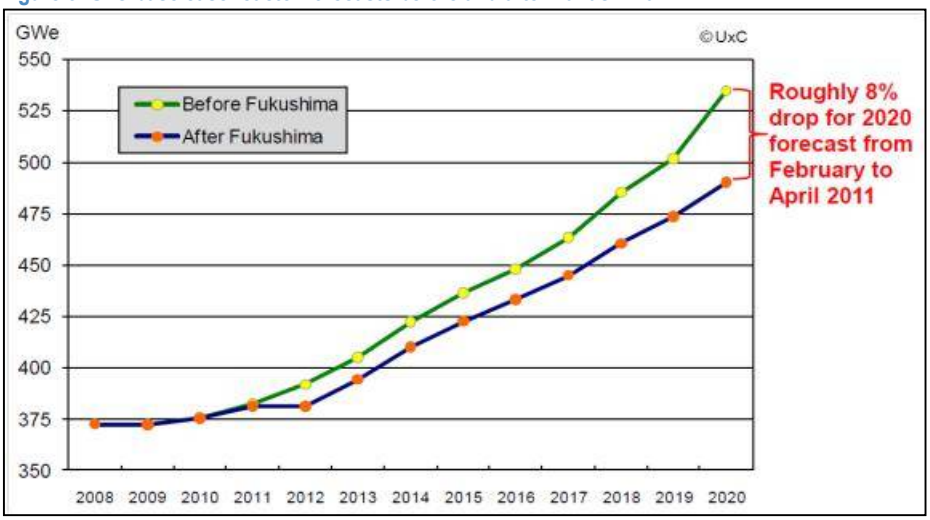
Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Demand

Medium-term nuclear power forecasts have come down since Fukushima

Clearly the incident at the Fukushima nuclear power plant in Japan in March 2011 has had a material impact on expected growth in demand for uranium. As shown below, industry publication Ux Consulting dropped its 2020 nuclear power forecasts by 8% as a result of the accident in Japan.

Figure 5: UxC base case reactor forecasts before and after Fukushima



Source: UxC

It is also apparent that global public opinion has turned more negative: prior to the incident in Japan, nuclear power was generally perceived as a potential solution to carbon pollution, but now there is an increased emphasis on the potential safety risk associated with nuclear power plants. French Energy Minister Eric Besson highlighted this concern in October 2011:

> *"When looking at the outlook for nuclear power, the diagnosis needs to be qualified. Two years ago we were talking about a nuclear renaissance and now we are talking about a nuclear winter. The reality is in between."*

Nonetheless, most countries around the world remain committed to the use of nuclear power to service future energy requirements. Outside of Japan, only Germany, Italy and Switzerland have since decided to either cancel or phase out nuclear power:

- **China (7% of current global demand):** In October 2011, Jiang Kejun, a director of the Energy Research Institute at the National Development and Reform Commission, the top Chinese economic planning agency, said that the government was sticking to its target of 50 gigawatts of nuclear power by 2015, compared to just 10.8 gigawatts at the end of last year. Mr. Jiang said in an interview that nuclear power construction targets for 2020 had not yet been set and might end up slightly lower than they would have been without the meltdowns in Fukushima.

- **France (15% of current global demand):** In June 2011, French president Nicolas Sarkozy told journalists: "There is no alternative to nuclear energy today. We are going to devote €1bn to the nuclear programme of the future, particularly fourth-generation technology."

- **Germany (3% of current global demand):** In May 2011, Germany, has announced plans to abandon nuclear energy over the next 11 years, outlining an ambitious strategy in the wake of Japan's Fukushima disaster to replace atomic power with renewable energy sources. Chancellor Angela Merkel said she hopes the transformation to more solar, wind and hydroelectric power serves as a roadmap for other countries.

- **India (2% of current global demand):** In June 2011, Indian Prime Minister Manmohan Singh said: "Nuclear energy today accounts for only 3 per cent of total energy generated in our system. As of now, our capacity is less than 5,000MW. The target is to increase it to 20,000MW by 2020."

- **Italy (no current nuclear program):** In June 2011, the Italian public voted overwhelmingly to reject Prime Minister Silvio Berlusconi plans for nuclear power plants by 94% of those who voted. Berlusconi had proposed a restart of the nuclear program that was abandoned in the late 1980s in a referendum soon after Chernobyl.

- **Japan (4% of current global demand):** In September 2011, Japanese Prime Minister Yoshihiko Noda called for nuclear plants halted after the Fukushima crisis to be restarted. But in his first policy speech since taking office, he told parliament that Japan should aim to reduce its reliance on nuclear power in the long term.

- **Republic of Korea (6% of current global demand):** In March 2011, South Korean Minister of Knowledge Economy Choi Joong-kyung said in a speech to a business event: "Our answer to the nuclear industry is that we need to keep going."

- **Russia (8% of current global demand):** In July 2011, Russian Prime Minister Vladimir Putin said "Despite the tragedy in Japan, we are gradually implementing our plans to increase the share of nuclear energy in Russia from the current 15-16 per cent to 20. We will be developing this sector."

- **Switzerland (1% of current global demand):** In May 2011, the Swiss government voted to abandon nuclear power in their country; their last reactor will finally go offline in 2034. The nation's five remaining nuclear power plants will slowly be phased out, and no new reactors will be built. The government had already suspended approval for three new nuclear power stations in March, due to safety concerns.

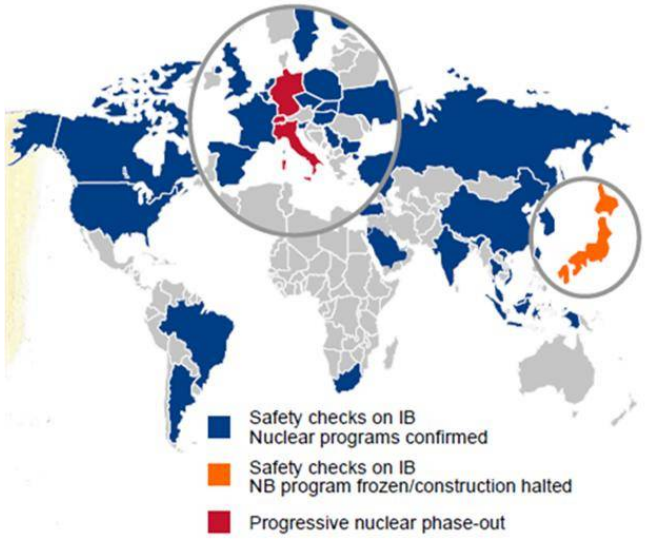
- **United Kingdom (4% of current global demand):** In July 2011, the British Parliament voted on the National Policy Statement for Nuclear, ratifying the programme for building new nuclear power plants in the United Kingdom. This vote is the confirmation of the government's decision to use nuclear power to meet the UK's growing need for low carbon electricity production.

- **United States (29% of current global demand):** In April 2011, NRG Energy (wholesale power generation company headquartered in Princeton, New Jersey) indicated that regulatory uncertainty in the United States in the wake of Japan's Fukushima nuclear accident would force the company to abandon a plan for two additional reactors in Texas and to write off its investment in the project.

  Nonetheless, President Barack Obama had earlier provided support for the country's nuclear program. In March 2011, Steven Chu, US energy secretary, told Congress: "I think we will, no matter what happens, try to take the lessons of Fukushima and apply them to our existing fleet and any future reactors we will be building."

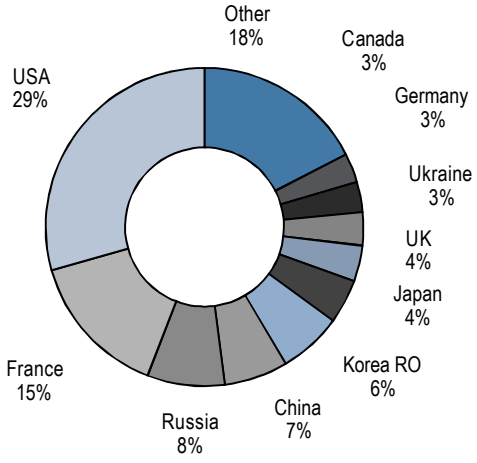
The charts below show the regions around the world where nuclear power has been phased out and the largest users of nuclear power in 2011. As can be seen from the charts, the direct impact has been relatively modest. However, other countries around the world have lifted safety requirements which have resulted in delays to projected growth in nuclear capacity.

Figure 6: Global commitment to nuclear power



Source: Areva June 2011 presentation

Figure 7: Proportion of global nuclear power 2011



Source: WNA

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

The industry is now forecasting nuclear power growth of ~2-3% per annum for the next decade

The latest forecasts from the International Atomic Energy Association (IAEA) dated August 2011 estimate total nuclear capacity of between 429GWe and 525GWe by 2020.

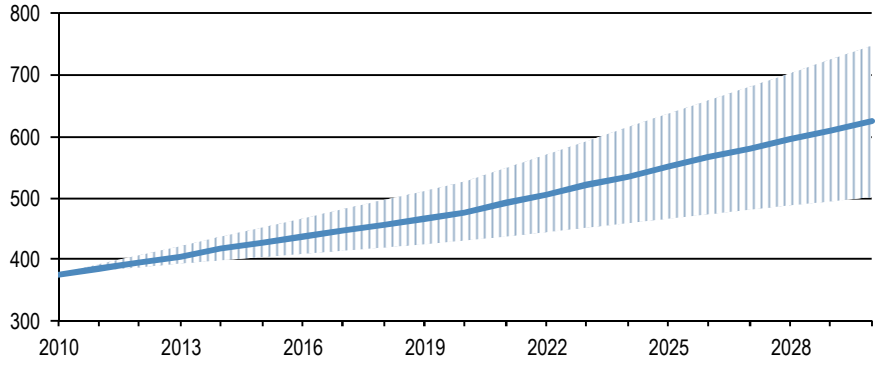
Figure 8: IAEA estimates of total and nuclear electrical generating capacity

Country Group	2010			2020 (a)			2030 (a)			2050 (a)(b)		
	Total Elect. GW(e)	Nuclear		Total Elect. GW(e)	Nuclear		Total Elect. GW(e)	Nuclear		Total Elect. GW(e)	Nuclear	
		GW(e)	%		GW(e)	%		GW(e)	%		GW(e)	%
North America	1165	113.8	9.8	1273 1310	119 126	9.4 9.6	1346 1526	111 149	8.3 9.7	1475	120 200	8.1 13.6
Latin America	313	4.1	1.3	457 587	6.4 6.4	1.4 1.1	982 1403	9 18	0.9 1.3	1990	15 60	0.8 3.0
Western Europe	843	122.9	14.6	1007 1058	93 126	9.2 11.9	1132 1389	83 141	7.4 10.1	1586	60 170	3.8 10.7
Eastern Europe	465	47.4	10.2	661 661	66 80	10.0 12.1	723 914	82 108	11.3 11.8	1031	80 140	7.8 13.6
Africa	130	1.8	1.4	383 422	1.8 1.8	0.5 0.4	781 1093	5 16	0.6 1.5	2630	10 48	0.4 1.8
Middle East and South Asia	418	4.6	1.1	538 954	13 22	2.4 2.3	1414 1885	30 53	2.1 2.8	5223	50 140	1.0 2.7
South East Asia and the Pacific	173			293 312			473 526	0 6	0.0 1.1	1242	5 20	0.4 1.6
Far East	1564	80.6	5.2	2222 2407	130 164	5.8 6.8	2818 3381	180 255	6.4 7.5	5215	220 450	4.2 8.6
World Total Low Estimate	5071	375.3	7.4	6835	429	6.3	9669	501	5.2	20391	560	2.7
World Total High Estimate				7711	525	6.8	12118	746	6.2		1228	6.0

Source: IAEA

Graphically, the chart below shows IAEA's forecasts to 2030. The data implies annual growth over the next decade of between 2% (low case) and 3% (high case).

Figure 9: Nuclear capacity forecasts according to the IAEA [GWe]

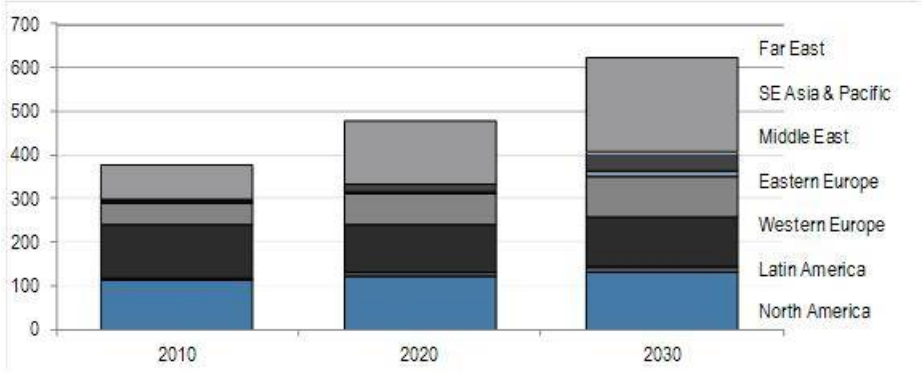


Source: IAEA

As expected much of this growth is expected to come from the "Far East" region (consisting significantly of China and Japan) and by 2030 this area is expected to represent 35% of overall nuclear power capacity.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 10: Nuclear capacity forecasts according to the IAEA [GWe]

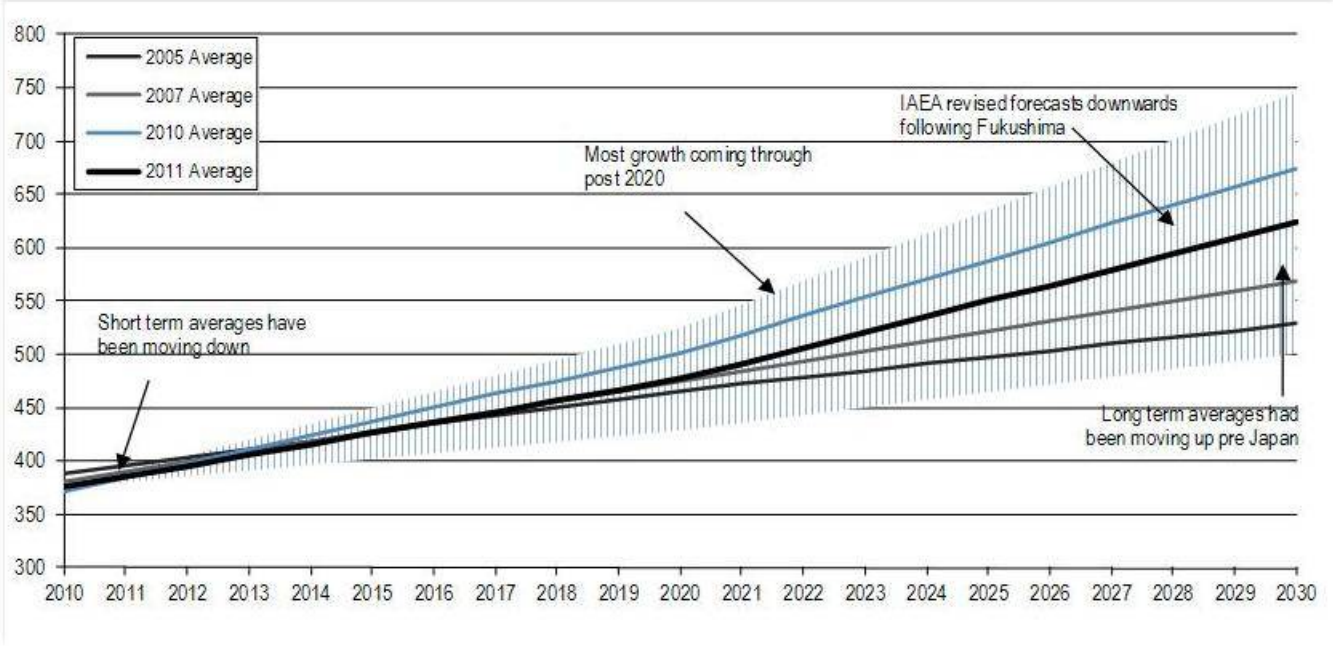


Source: IAEA

Figure 11 shows IAEA's 2011 forecasts compared to those provided in 2005, 2007 and 2010. As shown in the chart, power forecasts in 2020 had been consistently moving higher until the incident at Fukushima. The most recent estimate for 2020 is 5% lower than the 2010 forecast. Other trends shown in the forecasts are

- Growth is expected to accelerate beyond 2020, and
- Short-term averages have been consistently moving lower implying that expansions have not been completed on time.

Figure 11: IAEA 2011 forecasts compared to historical estimates



Source: IAEA

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

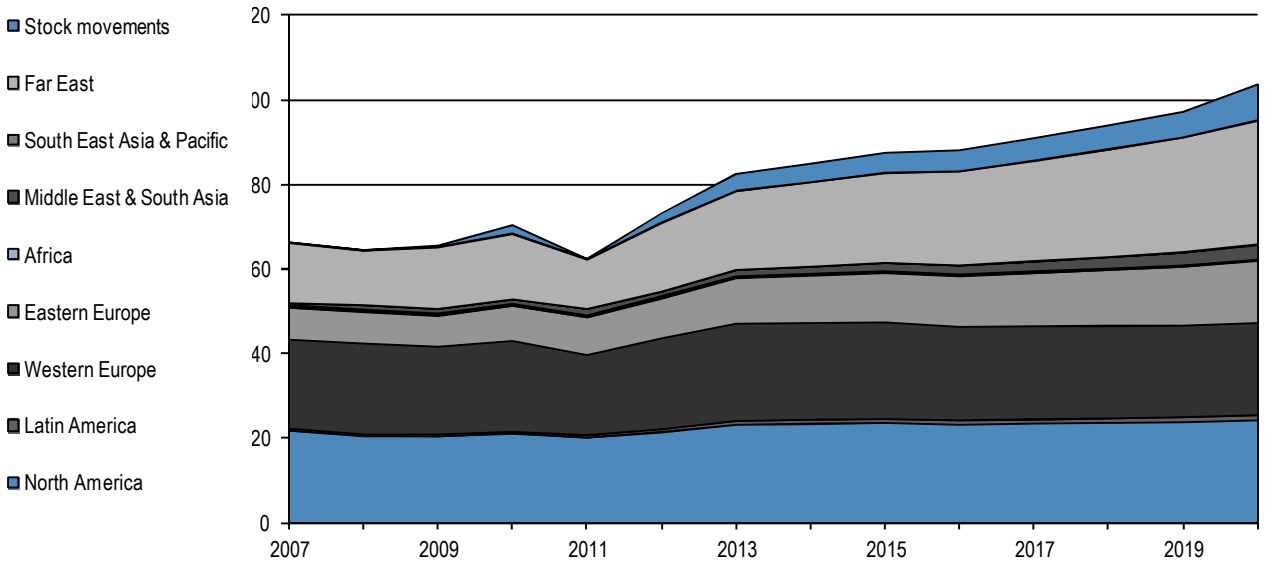
We estimate uranium demand growth of ~4% per annum over the next ten years

According to WNA, each GWe of capacity requires ~200tU/yr of extra mine production and 400-600tU for the first fuel load. 1tU requires ~1.18t U_3O_8 which means each GWe of capacity will require 235t U_3O_8/yr of extra mine production and 470-705t U_3O_8 for the first fuel load.

Based on IAEA's nuclear capacity forecasts, we expect uranium demand to grow on average 4.0% per annum between 2010 and 2020. Clearly the biggest driver of the growth will be China, with the Far East region forecast to grow 6.6% per annum between 2010 and 2020.

As shown in Figure 12, following depressed demand in 2011 we have allowed for below trend demand in 2012, but accelerating in 2013 and 2014. Our 2012 uranium demand forecast is 4% above 2010.

Figure 12: Uranium demand forecasts [Kt U]



Source: J.P. Morgan estimates

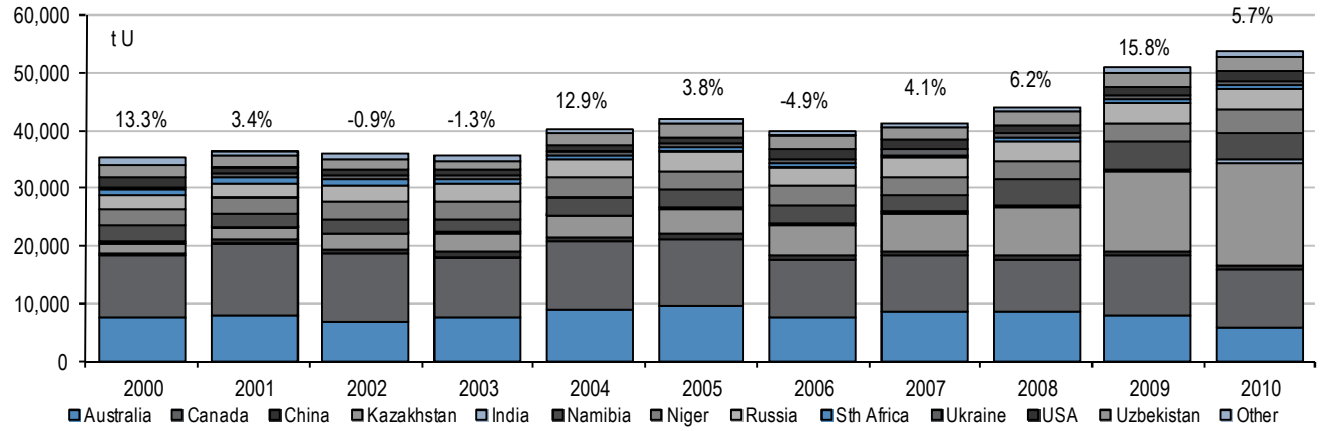
Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Supply

Mine supply has outpaced demand in recent years

The supply side is perhaps more interesting given that growth in mine production of uranium has outpaced demand for the last few years. Figure 13 shows global mine production over the last decade. As shown, mine production has grown at a compound rate of 4.3% over the last 10 years, and more impressively at 9.1% between 2008 and 2010 driven primarily by production from Kazakhstan and Namibia.

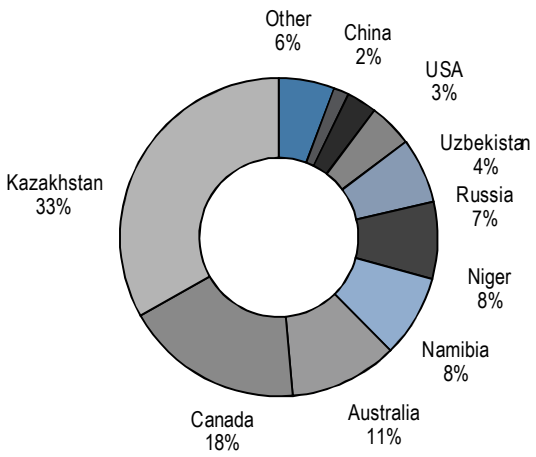
Figure 13: Global uranium mine production [t U]



Source: WNA

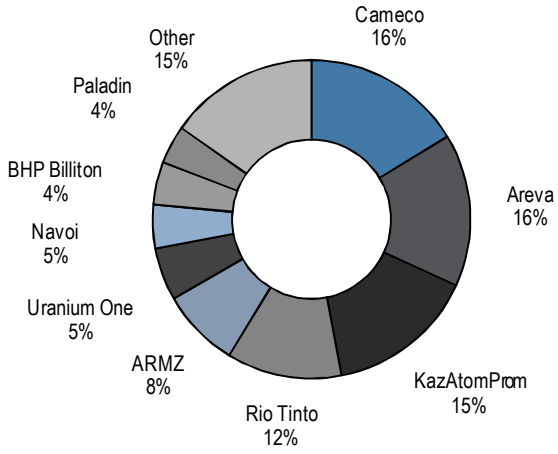
Furthermore, the largest producers have ambitious plans to continue to grow mine supply materially over the medium and long term. Figure 14 shows the largest uranium producing countries and Figure 15 shows the top 10 uranium producers in 2009 according to data from the World Nuclear Association.

Figure 14: Global uranium mine supply in 2010



Source: WNA, J.P. Morgan estimates

Figure 15: Largest uranium producers in 2010



Source: WNA

Of the largest producers:

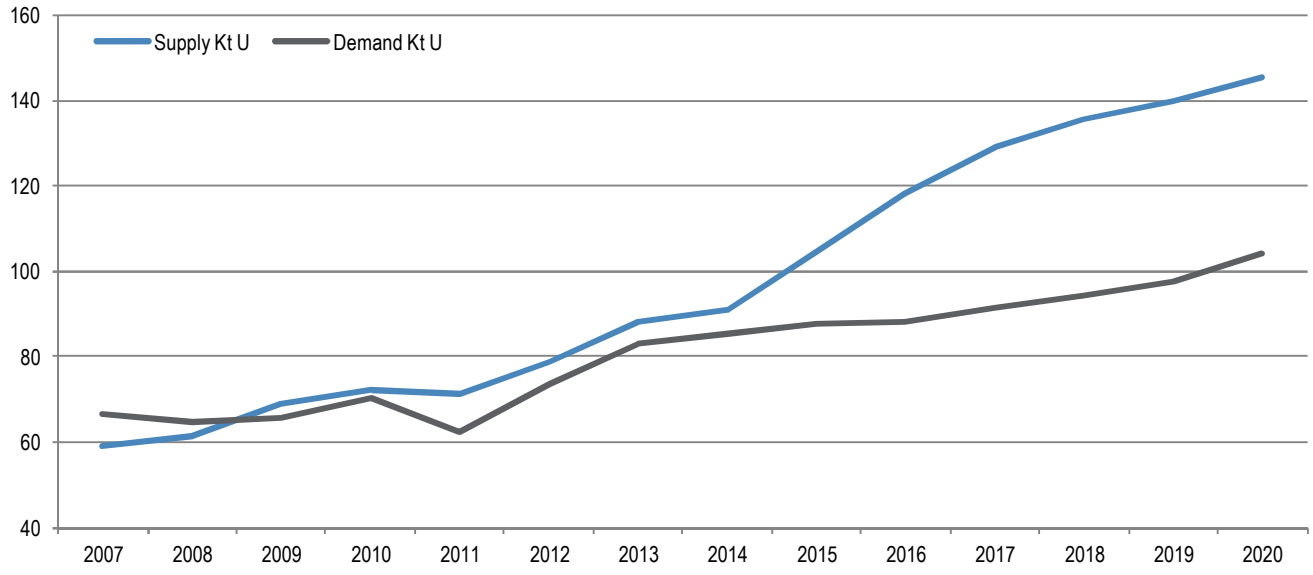
- Cameco plans on doubling production to 40Mlbs per annum by 2018 through its so-called "Double U" strategy;
- Areva has grown production faster than most of its peers and previously suggested another 16% to 40% growth by 2012;
- As recently as 2009, Rio Tinto indicated that it intended to double uranium production over the next five years;
- Uranium One plans on growing production from 10.5mlbs per annum to ~20mlbs per annum;
- BHP Billiton has not discussed its growth plans but is contemplating a major expansion of Olympic Dam, which alone could supply 25% of current global demand;
- In September 2010, Kazatomprom expressed plans to expand production by 40% by 2016, and
- Paladin currently has plans to double production by 2013.

In addition to the major producers, a number of junior developers and explorers are looking at greenfield projects to come online over the next decade.

Should producers achieve their growth targets there is likely to be a significant surplus of uranium

As shown in Figure 16 below, should all the producers achieve their targets, we estimate production would grow at a compound average rate of 7.3% over the next ten years. This is well ahead of projected demand growth of ~4.0% per annum and would therefore lead to a significant surplus of uranium.

Figure 16: Supply / demand balance based on company production forecasts



Source: J.P. Morgan estimates.

However, as uranium prices have faltered in recent years, there has been evidence that the producers generally expect higher prices to support their expansion projects:

- In March 2010 when the uranium spot price was ~US$40/lb, news reports indicated that depressing uranium prices had forced Areva to plan a review of its projects. According to the report:

  > *"There will be either a halt or delays in some of the large projects," said Sebastien de Montessus, director of AREVA's mining unit. "We have the flexibility to lower the 2012 target of 12,000 tU by more than 20 percent depending on market conditions."*

- BHP Billiton announced in June 2011 that it had put the Yeelirrie project on hold indefinitely with news reports suggesting that the project had not met the company's internal profitability and safety standards.
- In June 2011, Mega Uranium flagged delays to the feasibility study of the Lake Maitland project in Western Australia. A company spokesperson said it was too early to say how extensive a planned diamond drill program at the project would be or how long it would take.
- According to *LeMonde* in October 2011, Areva is likely to delay the Imouraren uranium mine project: According to the Internet site L'Expansion, Areva plans to delay the uranium mine project beyond 2013 as part of a massive restructuring program that is to be set up in reaction to a drop in demand caused by the German nuclear phase-out and the Fukushima disaster.
- In October 2011 following a sustained period of lower prices, Sergei Dara, Director of Strategic Development and International Projects at Kazatomprom, said that Kazakhstan has stabilized production to around 20,000 metric tons annually in order to avoid further depressing prices.
- In October 2011, Paladin confirmed that current uranium prices are not supportive of growth:

  > *"As other producers have also indicated, these low uranium price levels will dramatically impact the supply growth outlook and are therefore considered unsustainable if a viable and vibrant supply industry is to be established to support the growth in global nuclear power now being reaffirmed."*

- In December 2011, with uranium spot prices in the low US$50's, Areva announced that it was putting its investment in the US$1 billion Trekkopje uranium project on hold as the company braced itself for a worldwide loss of up to US$2 billion for 2011 (*the Namibian*).

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

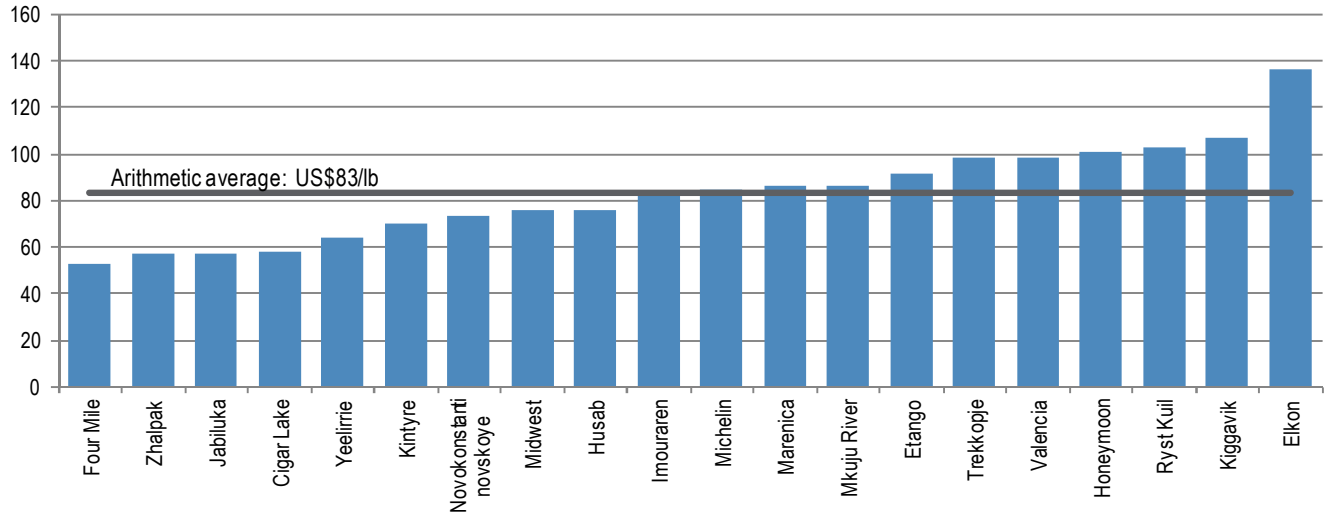
We estimate incentive prices for new uranium projects at ~US$80/lb

The implication of the announced delays to project development is that the incentive price for new production is likely to be above current uranium spot prices, leading to the producers reconsidering their growth plans.

Based on industry data, we have estimated the incentive prices required to achieve a 15% nominal rate of return for a selection of 20 greenfield projects. These projects are expected to come online over the next ten years and represent total capacity of ~66kt U_3O_8 (compared to current global mine production of ~62kt U_3O_8).

As shown in Figure 17, the analysis indicates that the average incentive price for these projects is ~US$80/lb, 54% above the current spot price of US$53/lb. Of these projects, not one has an incentive price lower than the current spot price, with the lowest being the Four Mile project in Australia which has an estimated incentive price of US$53/lb.

Figure 17: Estimated incentive prices for a selection of greenfield uranium projects



Source: J.P. Morgan estimates.

In fact, assuming the current uranium spot price to perpetuity, only the top five projects have positive IRR's (let alone meeting hurdle rates): Four Mile (13% IRR), Jabiluka (9%), Zhalpak (8%), Cigar Lake (7%), and Yeelirrie (5%).

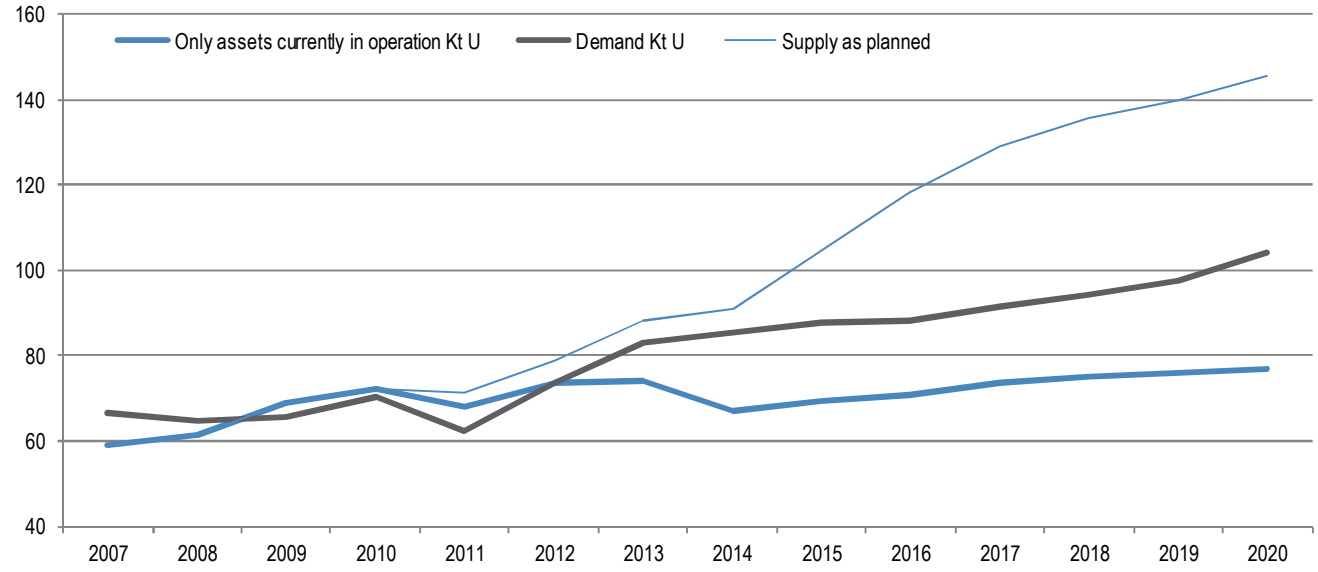
For further details of our incentive price analysis, refer to the appendix on page 43.

Forecast surplus of uranium depends on new projects coming online

The importance of the incentive price analysis is demonstrated in Figure 16: as we stated earlier should all producers and developers achieve their growth targets, then there is likely to be a substantial and growing surplus of uranium over the next decade.

However, as the chart below shows, if we only consider assets currently in operation (including brownfield expansions), then there is likely to be a substantial deficit of uranium over the next decade. This suggests that even meeting forecast demand (let alone a surplus) depends on the successful development of new projects.

Figure 18: Supply / demand balance based on assets currently in operation



Source: J.P. Morgan estimates.

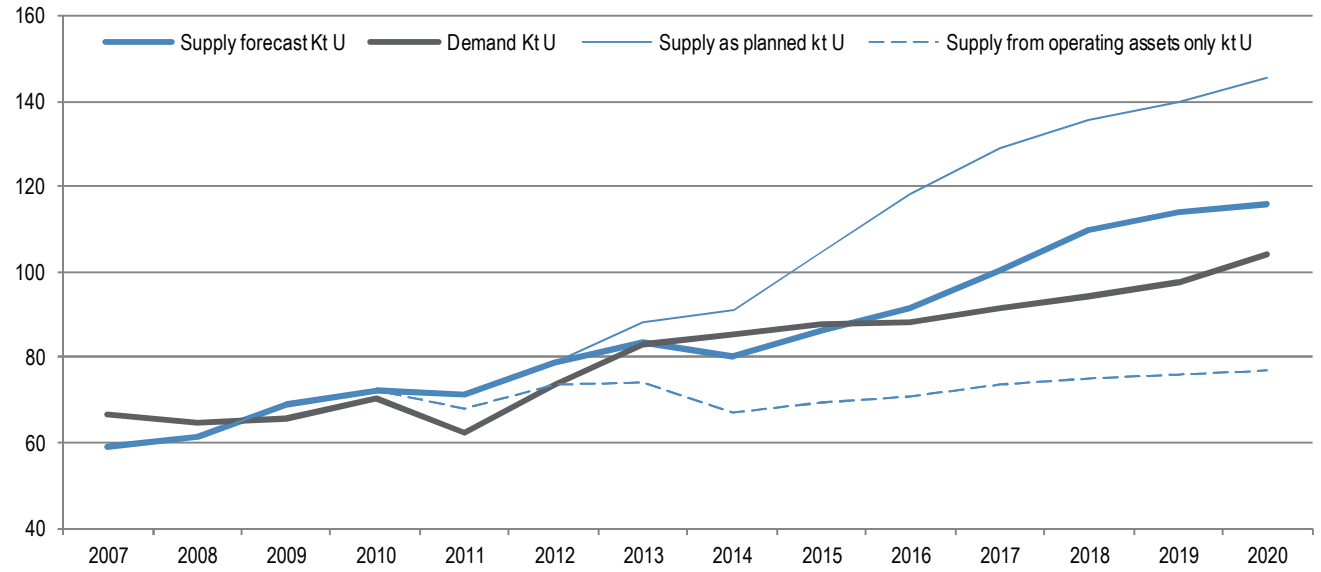
Therefore in forecasting supply/demand balances, we believe it is important to consider the likelihood of further delays or cancellations to projects due to unsupportive spot prices.

We have modified our supply/demand forecasts to account for delays and/or cancellations to project development. Generally, we have delayed projects' start dates until the forecast spot price is higher than our estimated incentive price.

Figure 19 shows our supply/demand forecasts to 2020 and how they compare to the "supply as planned" and "supply from operating assets only" scenarios which we discussed previously. As shown, we forecast a declining surplus of material in 2012 and 2013. However, from 2014 we project a significant deficit as secondary sources diminish. In 2015 and beyond, we see the market more in balance as low cost, large projects like Cigar Lake and Olympic Dam come online.

We discuss each forecast year and the derivation of our price forecasts in more detail from page 22.

Figure 19: Supply / demand forecast compared to company plans and supply from operating assets only



Source: J.P. Morgan estimates.

Pricing

We forecast prices to rise through to 2014 as expansion projects get pushed back

Table 7 below shows our new price forecasts. As shown, we are increasing our 2012 price forecast by 5% to US$63/lb, our 2013 forecast by 17% to US$70/lb, our 2014 forecast by 21% to US$85/lb, and our 2015 forecast by 25% to US$75/lb. We have also lifted our 2016-2017 price forecasts to US$60-$70/lb as shown below.

Table 7: Uranium price forecasts

		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Supply/demand balance															
Surplus / (Deficit)	kt U	-7.5	-3.0	3.2	1.7	8.6	5.5	0.5	-4.9	-1.7	3.3	9.0	15.6	16.5	11.7
New price forecast - REAL															
Spot uranium	US$/lb	97	60	45	46	57	63	70	85	75	70	65	60	60	60
Term uranium	US$/lb	91	83	66	61	67	68	75	90	80	75	70	65	65	65
Old price forecast - REAL															
Spot uranium	US$/lb	97	60	45	46	59	60	60	70	60	60	60	60	60	60
Term uranium	US$/lb	91	83	66	61	67	65	65	75	65	65	65	65	65	65

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 20: Supply and demand balance and price forecasts

SUPPLY		2007a	2008a	2009a	2010a	2011f	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Australia	kt U_3O_8	10.2	9.9	9.4	7.0	7.7	10.4	10.3	9.6	9.7	9.7	12.1	14.7	16.1	16.2
Canada	kt U_3O_8	11.2	10.6	12.0	11.5	12.2	12.1	13.3	14.5	16.2	19.0	20.4	22.1	24.4	25.0
China	kt U_3O_8	0.8	0.9	0.9	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
India	kt U_3O_8	0.3	0.3	0.3	0.5	0.8	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
Kazakhstan	kt U_3O_8	7.8	10.1	16.5	21.0	22.6	23.1	23.4	24.6	26.6	28.8	29.6	30.2	30.8	30.8
Namibia	kt U_3O_8	3.4	5.2	5.5	5.3	4.1	5.7	5.9	6.0	6.8	7.4	10.8	14.1	14.1	14.1
Niger	kt U_3O_8	3.7	3.6	3.8	5.0	4.7	4.7	5.2	5.2	5.2	5.8	5.8	7.0	7.0	7.5
Russia	kt U_3O_8	4.0	4.2	4.2	4.2	3.8	4.7	5.2	5.5	6.5	7.3	7.5	7.8	8.4	9.2
Sth Africa	kt U_3O_8	0.6	0.8	0.7	0.7	1.0	1.3	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Ukraine	kt U_3O_8	1.0	0.9	1.0	1.0	1.0	1.0	1.8	2.5	2.5	2.8	3.0	3.5	3.5	3.5
USA	kt U_3O_8	2.0	1.7	1.7	2.0	2.5	2.7	3.7	4.8	4.9	5.2	5.5	5.5	5.5	5.5
Uzbekistan	kt U_3O_8	2.7	2.8	2.9	2.8	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4	2.4
Other	kt U_3O_8	0.9	0.8	1.0	1.4	1.6	2.8	3.4	4.3	5.2	5.2	6.0	6.7	6.7	6.7
Total mine supply	**kt U_3O_8**	**48.7**	**51.7**	**59.9**	**63.3**	**65.4**	**73.0**	**77.9**	**83.0**	**89.7**	**97.1**	**106.7**	**117.7**	**122.6**	**124.5**
Total mine supply	**kt U**	**41.3**	**43.9**	**50.8**	**53.7**	**55.4**	**61.9**	**66.0**	**70.3**	**76.1**	**82.3**	**90.4**	**99.7**	**103.9**	**105.5**
Secondary sources	kt U	17.7	17.7	18.1	18.6	15.8	17.0	17.3	10.0	10.0	9.4	9.9	10.2	10.2	10.2
Total supply	**kt U**	**59.0**	**61.6**	**68.9**	**72.2**	**71.2**	**78.9**	**83.3**	**80.3**	**86.1**	**91.7**	**100.3**	**109.9**	**114.1**	**115.7**

DEMAND		2007a	2008a	2009a	2010a	2011f	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
North America	kt U	21.9	20.6	20.5	21.2	20.2	21.5	23.4	23.6	23.8	23.4	23.6	23.8	24.0	24.5
Latin America	kt U	0.7	0.7	0.7	0.7	0.8	0.9	1.0	1.0	1.1	1.1	1.1	1.2	1.2	1.3
Western Europe	kt U	21.1	21.6	20.9	21.5	19.0	21.5	23.1	23.0	22.9	22.2	22.0	21.9	21.8	21.9
Eastern Europe	kt U	7.6	7.4	7.3	8.3	8.9	9.5	10.7	11.2	11.7	12.0	12.6	13.2	13.8	14.6
Africa	kt U	0.3	0.3	0.3	0.3	0.3	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Middle East & South Asia	kt U	0.7	1.2	1.2	1.1	1.6	1.3	1.5	1.7	2.0	2.2	2.4	2.7	3.1	3.5
South East Asia & Pacific	kt U	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Far East	kt U	14.3	12.9	14.6	15.5	11.7	16.1	18.6	19.9	21.3	22.2	23.8	25.4	27.2	29.4
Stock movements	kt U	0.0	0.0	0.3	1.9	0.0	2.3	4.1	4.4	4.7	5.0	5.3	5.7	6.1	8.5
Total demand	**kt U**	**66.5**	**64.6**	**65.7**	**70.6**	**62.6**	**73.4**	**82.8**	**85.2**	**87.8**	**88.4**	**91.3**	**94.3**	**97.6**	**104.1**

BALANCE		2007a	2008a	2009a	2010a	2011f	2012f	2013f	2014f	2015f	2016f	2017f	2018f	2019f	2020f
Surplus / (Deficit)	kt U	-7.5	-3.0	3.2	1.7	8.6	5.5	0.5	-4.9	-1.7	3.3	9.0	15.6	16.5	11.7
Price forecast - REAL															
Spot uranium	US$/lb	97	60	45	46	57	63	70	85	75	70	65	60	60	60
Term uranium	US$/lb	91	83	66	61	67	68	75	90	80	75	70	65	65	65

Source: J.P. Morgan estimates.

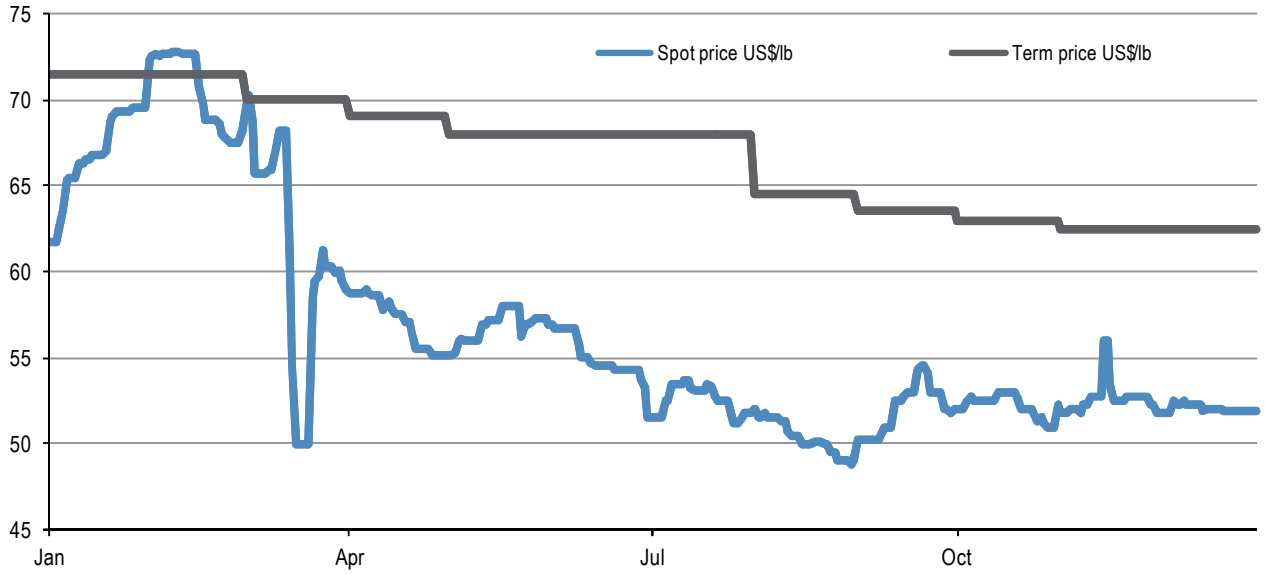
Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

2011 to 2015 forecasts

2011 – impacted by Fukushima

As shown in Figure 21 below, the incident at the Fukushima reactor in March 2011 prompted uranium prices to fall materially. Prices reached a low of US$49/lb in August 2011 and have subsequently been increasing to the current spot price of US$53/lb.

Figure 21: Uranium prices in 2011



Source: Bloomberg, Cameco

From our conversations with industry contacts, the incident at Fukushima in March 2011 did not change the utilities buying materially (with the exception of those utilities directly impacted such as the ones in Japan and Germany where policy changes occurred).

However, it did change the attitude of financial intermediaries, which trade uranium on the spot price (~25% of the overall market). As intermediaries sold product following the incident, the spot price saw an almost immediate fall: in three days in March 2011, the price fell 26% from US$68/lb to US$50/lb.

As seen in the chart, term prices did not fall initially. However, the widening spread between spot and term meant that at the margin, the utilities started buying on spot deferring the renewal of contracts at higher term prices. This eventually put pressure on the term price leading to a steady decline through the year.

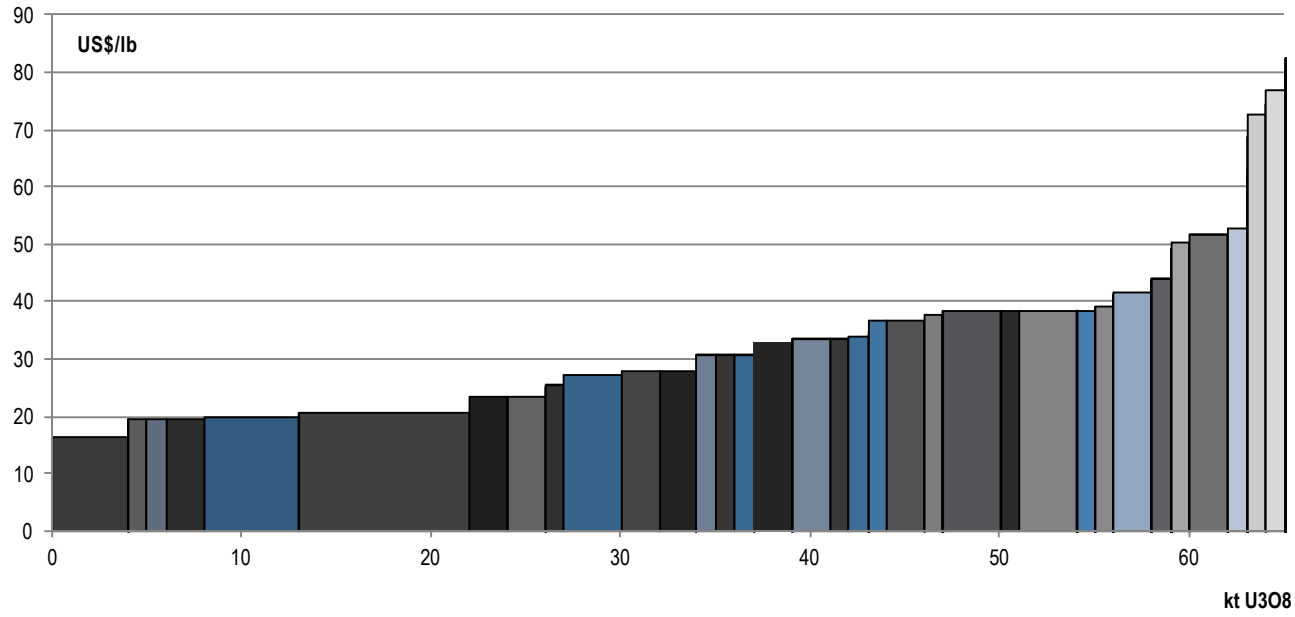
Prices have subsequently stabilized with the spot price trading between US$50/lb and US$55/lb since August 2011; and the term price steady at US$63/lb for the last three months.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

We see cost curve support at US$50/lb

While we estimate that the market saw an overall surplus of ~9kt U in 2011, as shown in the cost curve below, marginal cost of production is ~US$50-$60/lb. We believe that cost curve support likely acted as a floor to prices in 2011.

Figure 22: 2011 mine supply cost curve



Source: UxC, J.P. Morgan estimates

2012 – we expect a smaller surplus and higher prices

According to our sources, the spot market has been quiet in recent months, as is its normal yearly pattern. However, the annual Nuclear Fuel Supply Forum (to be held in Washington on January 24) typically kicks off activities. We expect that the first half of 2012 will be relatively quiet, but the second half will be much better.

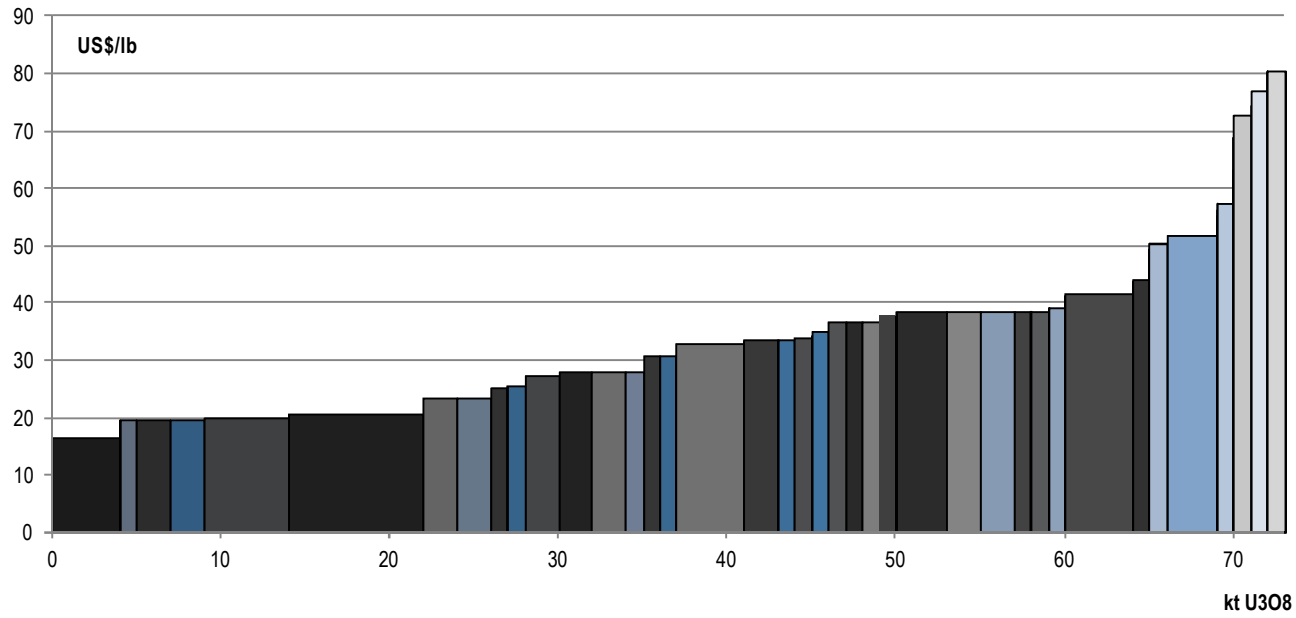
Overall, in 2012, we expect global demand to revert to trend and increase to 73kt U, up 17% from the depressed 2011 levels (but an increase of only 4% from 2010).

We project total supply of 79kt U in 2012, up 11% from 2011, and an increase of 9% from 2010. New supply is likely to come from:

- ERA's Ranger project which should recover from lower production in 2011 due to wet weather which resulted in the processing plant being shut-down for a period of six months;
- Growth in Kazakhstan with Centralnoye and Kendala continuing to ramp up to full production, and South Inkai starting production;
- Continued ramp up of the Khiagda asset in Russia; and
- The start-up of two new projects in Australia: Alliance Resources' Four Mile and Uranium One's Honeymoon, both located in South Australia.

Figure 23 shows our projected cost curve for 2012. As shown, marginal cost is likely to remain ~US$50-$60/lb. However, with the market forecast to be in deficit over the following few years, we believe that prices will exceed marginal cost of production in the second half of the year. We estimate a 2012 average uranium spot price of US$63/lb with prices rising from US$55/lb in the March 2012 quarter to US$70/lb in the December 2012 quarter.

Figure 23: 2012 mine supply cost curve



Source: UxC, J.P. Morgan estimates

2013 – the start of project deferrals

We forecast demand growth of ~5% in 2013 to 83kt U. We note that with supply from Russian secondary sources likely to diminish in 2014, there could be upside to our demand forecast as utilities build stocks ahead of the expected decline in supply.

In 2013, we project supply growth of 6% to 83kt U resulting in a slight surplus. Nonetheless, ahead of secondary sources diminishing in 2014, we forecast uranium prices to increase to US$70/lb. Mine production growth is forecast to come from:

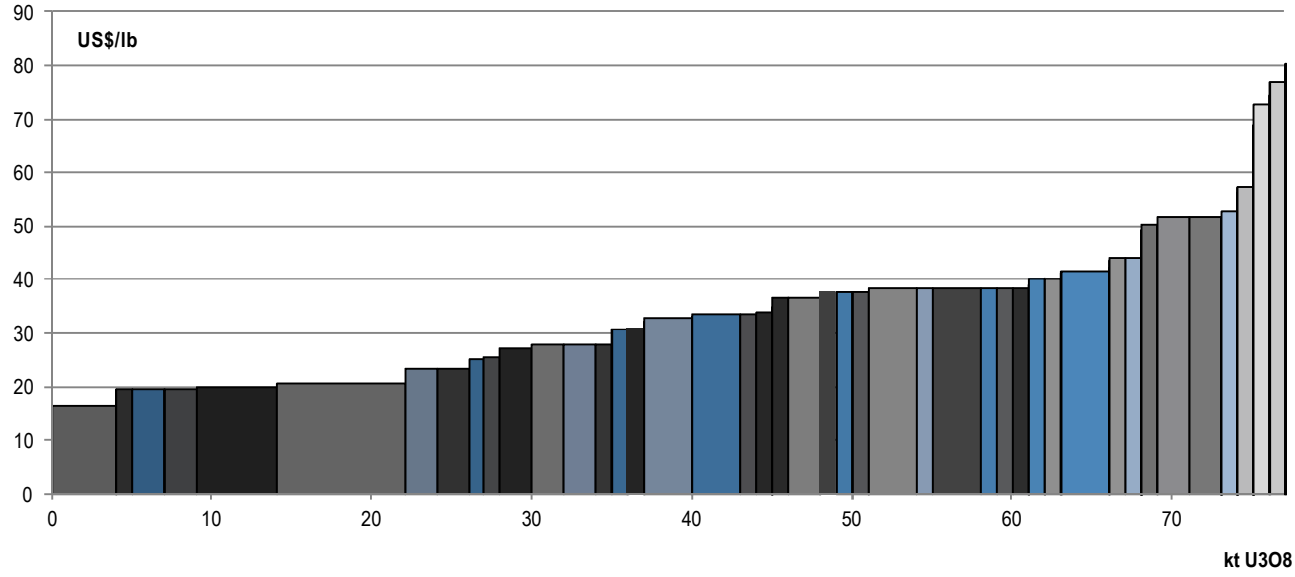
- Continued ramp up of Irkol, Four Mile, Khiagda, and Honeymoon;
- New supply from the Lance project in the United States, Zhalpak in Kazakhstan, Novokonstantinovkoye in Ukraine, and the Midwest project in Canada.

However, more importantly, we believe 2013 could be the first evidence of significant deferrals that impact supply, with the following projects likely to be delayed due to incentive prices being higher than forecast spot prices:

- **Areva's Imouraren:** This project was expected to commence in 2013, but we estimate an incentive price for the project of ~US$84/lb, above our uranium price forecasts in 2012 and 2013.
- **ARMZ's Elkon:** This large project in Russia is also currently expected to commence production in 2013. However, with an incentive price of US$136/lb (driven predominately by a capital cost of US$3.5bn), it is unlikely to come into production as planned, in our view.
- **Shiva Uranium's Dominion:** With an estimated operating cost of US$69/lb, we believe Shiva Uranium's South African project is likely to be delayed from the currently scheduled 2013.

Ahead of the forecast deficit in 2014, we believe that prices will exceed marginal cost of production and we estimate a 2013 average uranium spot price of US$70/lb.

Figure 24: 2013 mine supply cost curve



Source: UxC, J.P. Morgan estimates

2014 – uranium prices peak as secondary sources diminish

We forecast demand to grow at 3% in 2014, but with no Russian secondary sources, we forecast supply to decline 4% resulting in a deficit of 4kt U. Based on a supply deficit, we believe prices are likely to be driven by demand destruction and therefore are likely to be above cost curve support. We forecast a 2014 uranium spot price of US$85/lb but believe it is possible that it could be higher given that fuel costs for a nuclear reactor are relatively low.

We forecast mine supply to increase by 6% in 2014 driven predominately by:

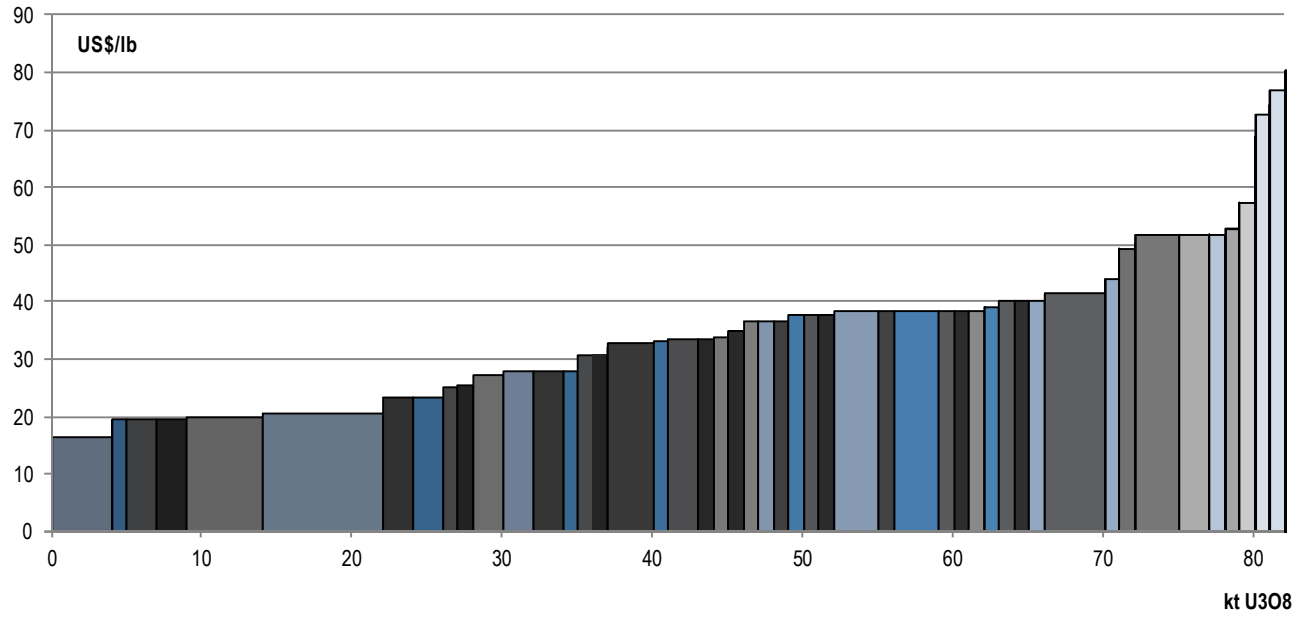
- Further growth at Zhalpak in Kazakstan, Novokonstantinovskoye and Lunnoye in Russia, and Midwest in Canada; and
- Mkuju River in Tanzania starting up.

Cameco's Cigar Lake is expected to start in 2014, but given several delays already, we conservatively forecast the project to start in 2015. Furthermore, we continue to allow for delays in the following projects given that even at spot prices of US$85/lb, the projects will not likely meet hurdle rates:

- **Imouraren, Elkon and Dominion:** Again we foresee further delays in these projects;
- **Valencia:** We forecast an incentive price for the project in Namibia of US$99/lb and therefore incorporate indefinite delays to the start date.

As Figure 25 shows, marginal cost of production by 2014 is only ~US$60/lb, but with a forecast deficit, prices are likely to be driven by demand destruction and therefore should be above cost curve support, in our view.

Figure 25: 2014 mine supply cost curve



Source: UxC, J.P. Morgan estimates

2015 and beyond – the introduction of large, low-cost projects to result in prices reverting to mean

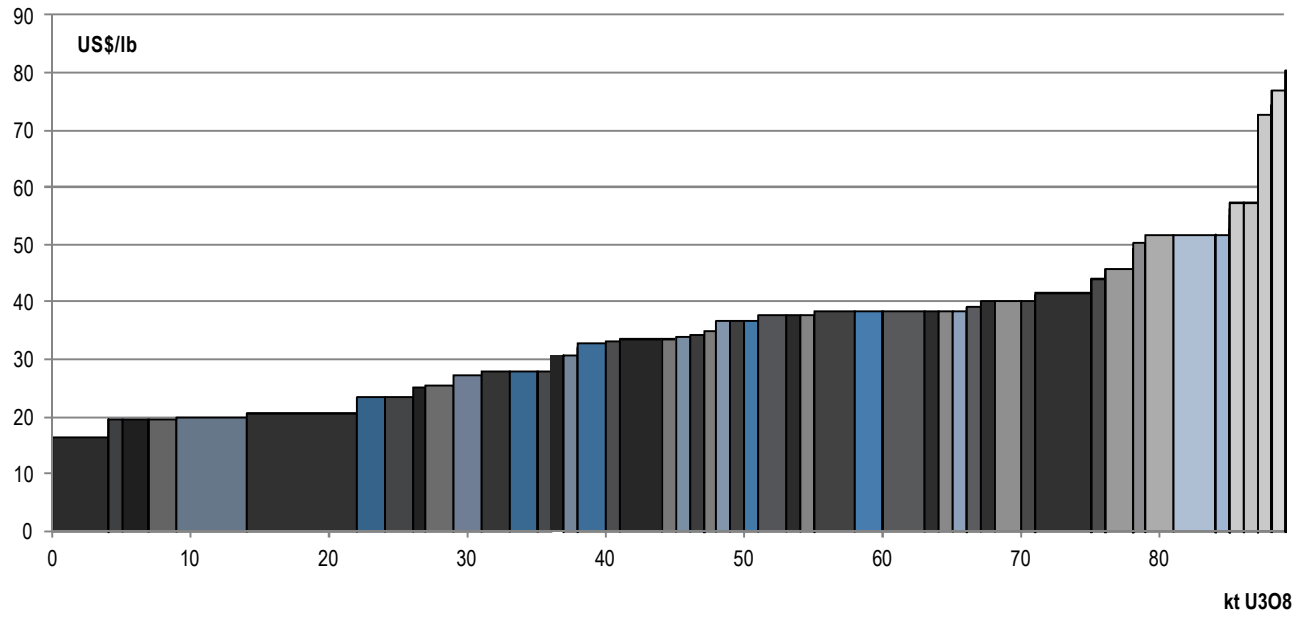
We forecast another deficit in 2015, but more importantly, we believe the introduction of large, low-cost projects is likely to result in prices moving back to cost curve support of US$50-$60/lb.

In particular, Cigar Lake (with an estimated incentive price of only US$58/lb) and the expansion of Olympic Dam (which we forecast to come online from 2018) at a likely much lower incentive price will likely see market demand met by mine supply, in our view.

On the basis that prices are forecast to decline from 2015, we expect to see further delays if not cancellation of several higher-cost projects including: Imouraren in Niger, Bakouma in the Central African Republic, Marenica, Valencia and Etango in Namibia, Wiluna in Australia, Elkon in Russia, and Dominion in South Africa.

Our 2015 projected cost curve, shown below, implies a marginal cost of production around US$60/lb which we consider to be our long-term price.

Figure 26: 2015 mine supply cost curve



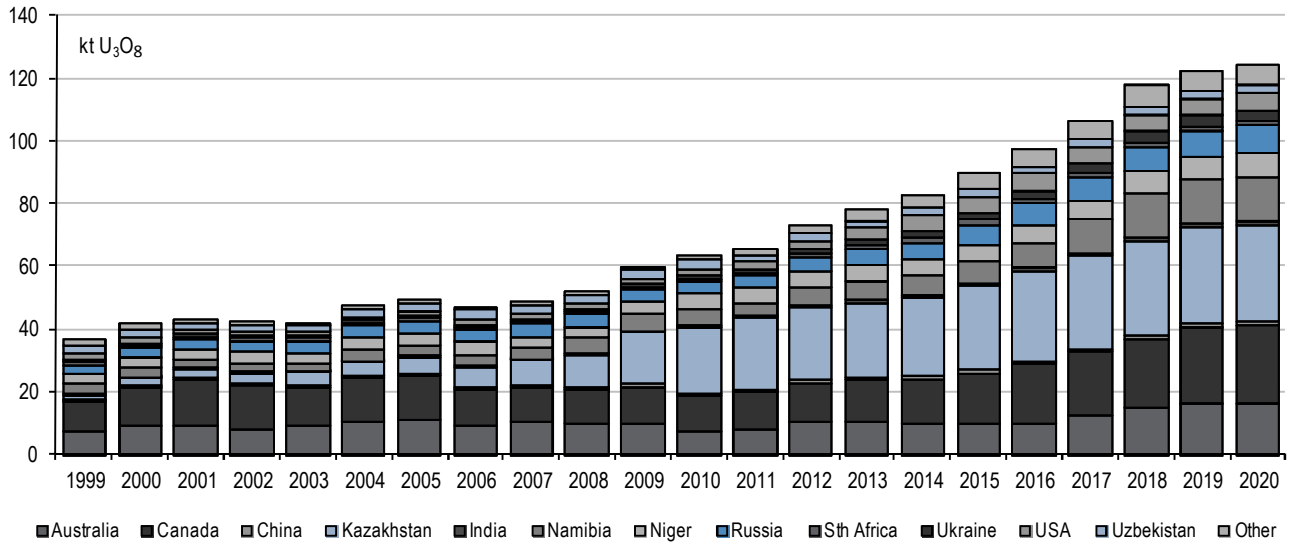
Source: UxC, J.P. Morgan estimates

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Appendix 1 - supply by country

Figure 27 below shows historical mine supply by country and our projections for the next ten years. As shown, we expect mine supply to grow ~7% per annum with the majority of growth coming from traditional sources: Kazakhstan, Canada, Australia and Namibia.

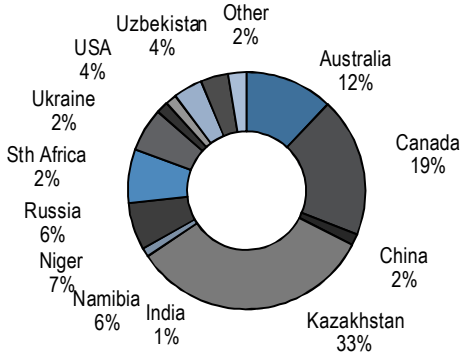
Figure 27: Mine supply by country



Source: J.P. Morgan estimates.

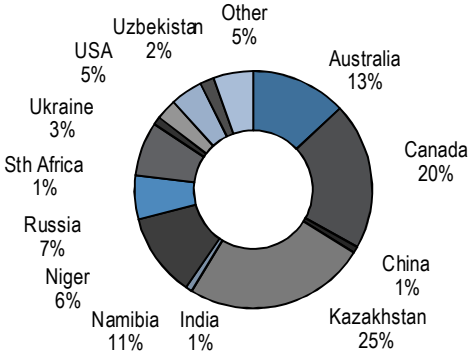
The figures below show current and projected market share by country. As shown, we do not expect any significant changes to market shares over the next ten years with world supply continuing to be dominated by Kazakhstan, Canada and Australia.

Figure 28: Market share of mine supply - 2011



Source: J.P. Morgan estimates.

Figure 29: Market share of mine supply - 2020



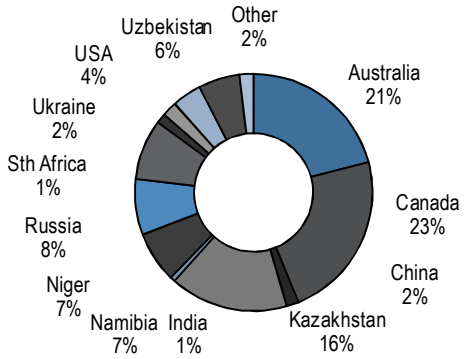
Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Kazakhstan is now the largest producer of uranium globally

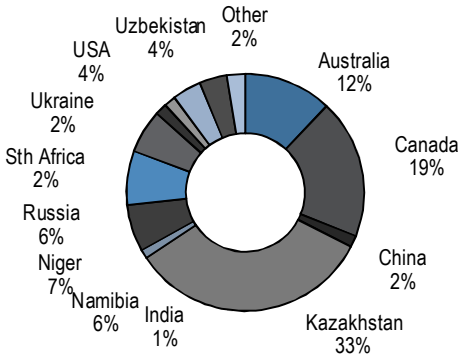
Much of the supply growth over the last five years has come from Kazakhstan. The Eastern European country, which holds more than 15% of global uranium reserves, surpassed Canada as the world's largest producer of the metal in 2009.

Figure 30: Market share of mine supply - 2007



Source: J.P. Morgan estimates.

Figure 31: Market share of mine supply - 2011



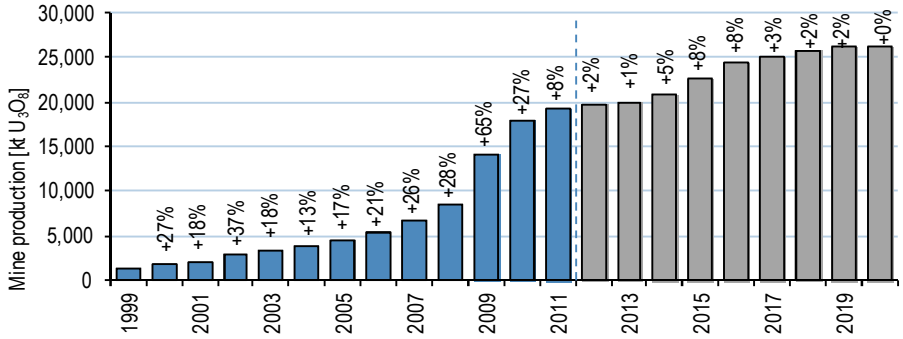
Source: J.P. Morgan estimates.

In September 2011 Vladimir Shkolnik, chief executive of Kazatomprom, said that Kazakhstan would produce 19,600 tonnes of uranium in 2011, up 10% from the 17,803 tonnes produced in 2010.

The Central Asian country has previously said it could raise production to more than 25,000 tonnes by 2015. However, in October 2011 following a sustained period of lower prices, Sergei Dara, Director of Strategic Development and International Projects at Kazatomprom, said that Kazakhstan has stabilized production to around 20,000 metric tons annually in order to avoid further depressing prices.

As shown below, we expect a flattening in production growth from the country. Overall, we project growth in Kazakhstan of 8% in 2011, 3% in 2012 and 2% in 2013. On our forecasts, we project production to reach 25,000 tonnes by 2016.

Figure 32: Kazakhstan mine supply growth



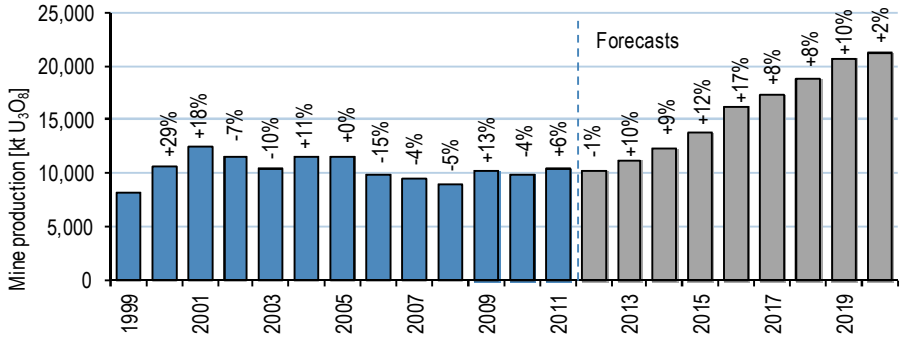
Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Canadian supply growth to be driven by Cigar Lake

As shown below, Canadian mine supply has largely been in decline for the last ten years given its mature mines and a lack of investment in exploration and development. However, from 2013 there are a number of projects expected to support growth, such as Areva's Midwest, and later Cameco's Millenium. Additionally, Cigar Lake is likely to drive production significantly higher from 2014-15 onwards.

Figure 33: Canada mine supply growth

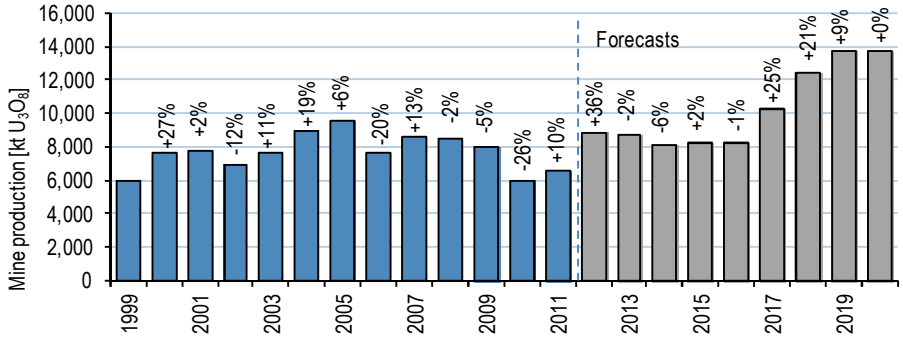


Source: J.P. Morgan estimates.

The Olympic Dam expansion project is likely to result in substantial production growth in Australia over the longer-term

Australia has the world's largest known uranium resources. However, growth has been curtailed over the last decade by the so-called "no new mines" policy implemented by the Australian Labor Party. Short-term, production is likely to be driven by execution at ERA's Ranger mine which is now back in full production following a 6-month shutdown. Beyond 2017, we forecast substantial growth from the development of the Olympic Dam Expansion project.

Figure 34: Australia's mine supply growth



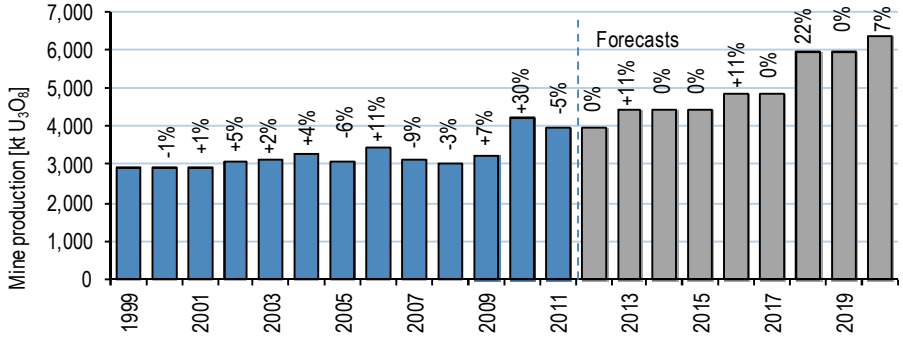
Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

We do not see much growth from Niger for the next five years

Production from Niger has been relatively consistent for the last decade. Additionally, as shown below, we forecast modest growth for the next five years until expansions at CNNC's Azelik results in higher production from 2016 onwards. We do not incorporate any contribution from Imouraren given we estimate that its incentive price is well above forecast uranium spot prices.

Figure 35: Niger's mine supply growth



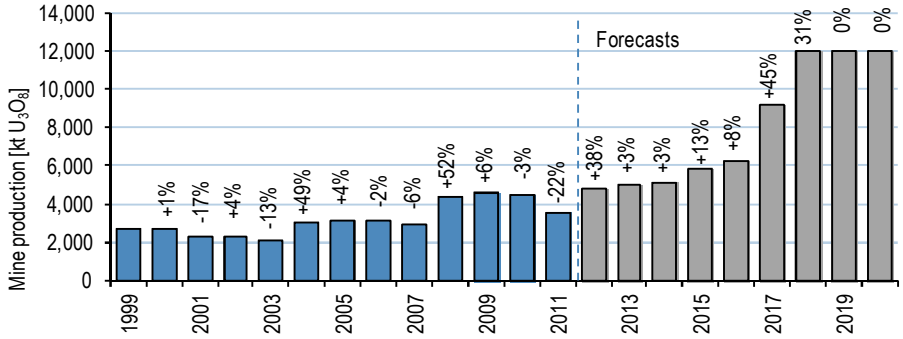
Source: J.P. Morgan estimates.

Growth in Namibia to come from Langer Heinrich, Trekkopje and Husab

Namibia currently produces uranium from Rio Tinto's Rossing, and Paladin's Langer Heinrich. There are a number of greenfield and brownfield projects in Namibia that planned for the development over the next decade.

However, we estimate that the incentive prices for the majority of them (such as Trekkopje, Marenica, Valencia and Etango) will likely mean that they will be deferred. Therefore, growth over the next ten years is projected to come from expansions to Langer Heinrich, and the development of Husab.

Figure 36: Namibia's mine supply growth



Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

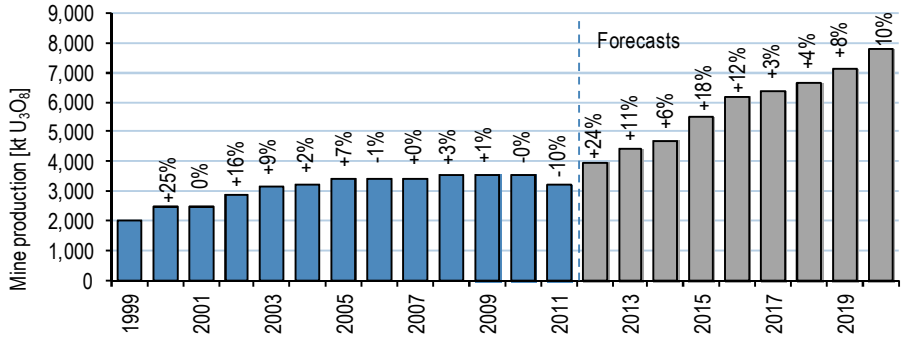
Russia has several large mines in development

As shown below, Russian mine growth has been relatively muted in recent years. However, there are several large greenfield and brownfield projects already in development in Russia, notably:

- **Elkon:** This is ARMZ principal focus, in the Sakha Republic. Production was planned to ramp up from 2013, to 3000 tU in 2015 and 5000 tU/yr by 2024.
- **Priargunksy:** Production at Priargunky is expected to be expanded from 3000 to 5000 tU/yr by 2020, with Mine #6 construction beginning in 2009 for Stage 1 production in 2019 and Stage 2 in 2024. Mine #8 is due to begin producing in 2011.

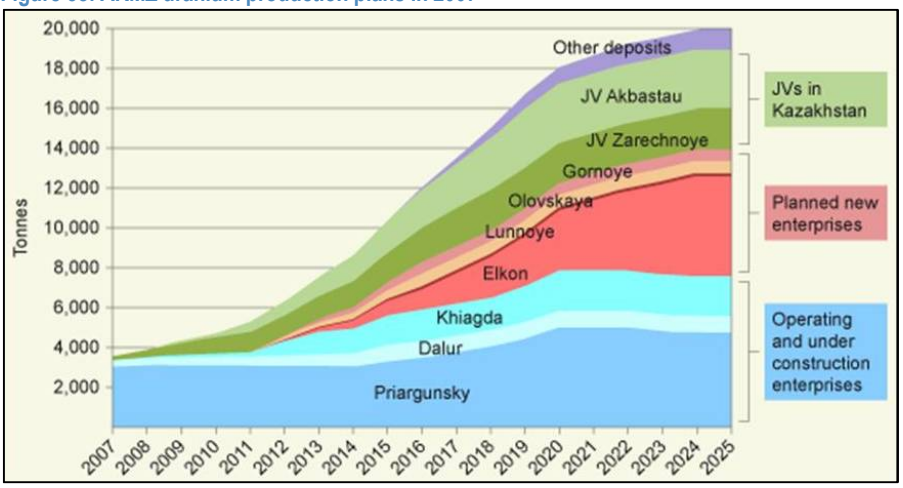
We note that in September 2011, ARMZ said that production costs at Elkon would be US$120-130/kgU (US$46-$50/lb U_3O_8), which would be insufficient in the current market, and costs would need to be cut by 15-20%. With an estimated incentive price of ~US$136/lb, we indefinitely delay the project in our forecasts, but see growth coming from Priargunsky, Khiagda, Gornoye, and Olovskaya where projected incentive prices are much lower.

Figure 37: Russia's mine supply growth



Source: J.P. Morgan estimates.

Figure 38: ARMZ uranium production plans in 2007



Source: Company reports.

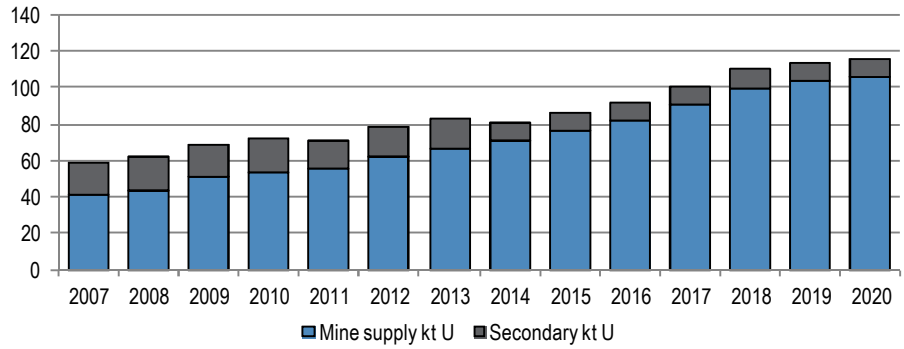
Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Appendix 2 – secondary sources

Secondary sources represent ~22% of total supply

We estimate secondary sources represent ~22% of current uranium supply. These sources include: reprocessing of material by the US Department of Energy and Russia (particularly weapons-grade material); recycling spent fuel, and tails re-enrichment. However, secondary sources are expected to decline and become a smaller part of uranium supply. We expect secondary sources to represent only 12% of supply by 2015.

Figure 39: Secondary sources and mine supply [kt U]



Source: J.P. Morgan estimates.

Since 1987, the US and countries of the former USSR have signed a number of disarmament treaties aimed to reduce nuclear arsenals by ~80%. Nuclear materials declared surplus to military requirements are now being converted to fuel for commercial nuclear reactors. The commitments by the US and Russia to convert nuclear weapons to fuel for electricity production is called the HEU-LEU (Highly-Enriched-Uranium to Low-Enriched-Uranium) or Megatons to Megawatts program.

In 1994, a US$12 billion implementing contract was signed between the US Enrichment Corporation (now USEC Inc) and Russia's Technabexport (Tenex) as executive agents for the US and Russian governments. Under the 1994 Agreement, USEC recognised the need to release the diluted military uranium to nuclear utilities in such a way as not to impact negatively on the US uranium market.

The US Department of Energy sells ~2-3ktpa of uranium into the market

The US Department of Energy holds substantial stockpiles of uranium which it has been reprocessing and selling into markets for use in utilities. The Department released a document in December 2008 which detailed its 10-year plan for the sale of these stocks. According to the document, in 2008, the DoE held ~153mlbs of "excess" uranium inventories in FY2008. Since then, only ~15mlbs has been sold into markets implying the DoE still has ~140mlbs available (shown in Table 8 on page 34).

The December 2008 plan set in place the framework within which the DoE would make decisions concerning the future use and disposition of the inventory. While the

plan's focus was a 10-year period to 2018, the disposition of the DoE's excess uranium was expected to take 25 years.

Table 8: DoE's "Excess Inventory"

Inventory	MTU	Enrichment Level	Natural Uranium Equivalent mlbs U_3O_8	Natural Uranium Equivalent MTU
Unallocated U.S. HEU	63.3	Highly-enriched	30.4	11,687
U.S.-Origin NU as UF6	2,528	Natural	6.6	2,528
Russian-Origin NU as UF6	11,136	Natural	29.0	11,136
Off-Spec Non-UF6	4,461	Depleted/Natural/Low-enriched	7.5	2,900
DU as UF6	73,777	Depleted	66.1	25,425
Total			**139.6**	**53,676**

Source: US DoE, J.P. Morgan estimates

The plan also stated that the DoE would undertake to optimize the use and disposition of its excess uranium assets in a manner that also minimizes any material adverse impacts on the domestic uranium mining, conversion and enrichment industries. Furthermore, the plan set a maximum of potential sales or transfers of uranium based on a combined annual quantity of no more than 10% of the annual U.S. nuclear fuel requirements with permission to exceed this for special purposes such as initial core loads for new reactors.

Table 9 shows the Department of Energy's plan for disposition of uranium from the December 2008 document.

Table 9: Representative DOE Excess Uranium Management Plan

tonnes of uranium equivalent	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Allocated HEU Down-blend (to commercial market)	584	816	923	798	1,005	997	992	659	491	402
Unallocated HEU Down-blend (LEU transfer)*		96	128	81	31					
Off-Spec Non-UF6 requiring additional processing before entering the market**	**	**	**	**	**	**	**	**	**	**
DU as UF6***		42	96	387	443	912	927	1,258	1,420	1,512
Sub-Total in MTU	584	954	1,147	1,266	1,479	1,909	1,919	1,917	1,911	1,914
Sub-Total in mlbs U_3O_8	1.5	2.5	3.0	3.3	3.8	5.0	5.0	5.0	5.0	5.0
10 Percent U.S. Requirements in million pounds U_3O_8	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Russian-origin NU for initial cores in MTU****			1,231	731	1,462	846	2,038	1,385		
Russian-origin NU for initial cores in million pounds U_3O_8			3.2	1.9	3.8	2.2	5.3	3.6		
Total in t of U	**584**	**954**	**2,378**	**1,997**	**2,941**	**2,755**	**3,957**	**3,302**	**1,911**	**1,914**
Total in mlbs U_3O_8	**1.5**	**2.5**	**6.2**	**5.2**	**7.6**	**7.2**	**10.3**	**8.6**	**5.0**	**5.0**

Source: Department of Energy

* Additional small-scale HEU down-blending projects are anticipated, but not yet planned, in this timeframe.

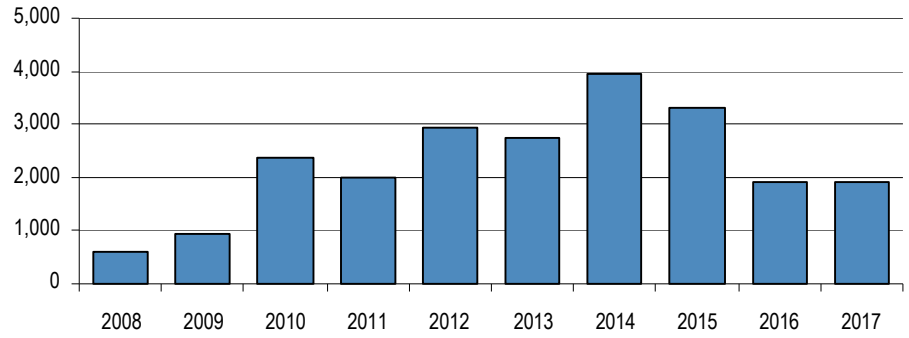
** DOE has 4,461 MTU of Off-Spec Non-UF6. If this material enters the market it would require substantial processing and would eventually be offered for use in the commercial market over a number of years. Responses to the initial Request for Proposal released in 2008 did not result in an award; however, future sales are possible as well as the identification of additional Off-Spec candidate material.

*** DU as UF6 having an assay equal to or greater than 0.35% 235U but less than 0.711% 235U. NU equivalent based on 0.20% tails assay.

****Tentative schedule, subject to future actions and decisions based on relevant considerations and conditions. May lead to uranium dispositions over 10% of the market for certain special purposes such as for initial cores.

As shown in Figure 40, total sales from the DoE are expected to increase to a peak of 4kt of Uranium Equivalent in 2014 before falling thereafter.

Figure 40: Total Department of Energy sales [t U]



Source: Department of Energy

Conversion of Russian weapons grade uranium for use in utilities is called the Megatons to Megawatts program

Overall, the blending down of 500 tonnes of Russian weapons HEU will result in about 15,000 tonnes of LEU from 1993 to 2013. This is equivalent to about 152,000 tonnes of natural U, or just over twice annual world demand. From 2000 to 2013 the dilution of 30 tonnes of military HEU is displacing about 10,600 tonnes of uranium oxide mine production per year, which represents some 13% of world reactor requirements.

However, the Megatons to Megawatts program is due to expire in 2013, potentially reducing supply of uranium oxide by 10,600tpa or ~13%.

Nonetheless, post completion of the program, Russia will be free to sell uranium to reactors at market prevailing prices (rather than selling through USEC as is currently mandated under the program). According to USEC, after 2013, the Russians will have the ability to sell up to 20% of U.S. SWU (Separate Work Units) demand directly to U.S. utilities representing ~4ktpa of U_3O_8. Nonetheless, in our modeling we assume Russian secondary supplies revert to zero post 2013.

Fuel recycling becoming more prevalent

According to the World Nuclear Association, there is about 1.5 million tonnes of depleted uranium available, from both military and civil enrichment activity since the 1940s, most at tails assay of 0.25 - 0.35% U-235. Non-nuclear uses of depleted uranium are very minor relative to annual arisings of over 35,000 tU per year. This leaves most of the material available for mixing with recycled plutonium or as a future fuel resource for fast neutron reactors.

Mixed oxide fuel (MOX) which is manufactured from plutonium recovered from used reactor fuel, is also becoming more prevalent in its use. Currently this source of supply only represents ~2% of total new nuclear fuel today (according to WNA) but with several new reprocessing facilities being built, it is likely that MOX use could increase over the medium term.

As shown in Table 10, total civil reprocessing capacity is currently ~5.5kt.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Table 10: Civil reprocessing capacity [t U]

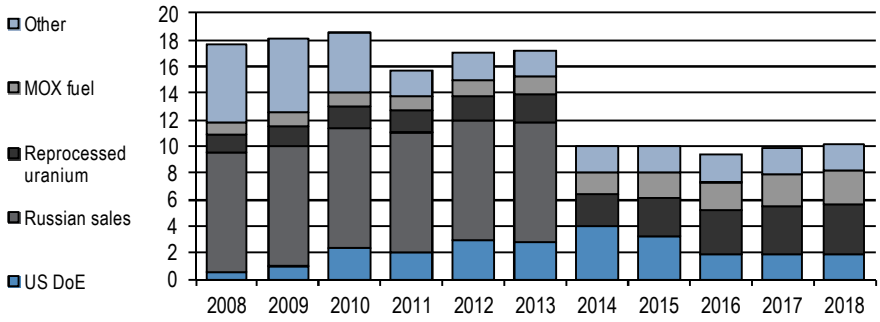
	Capacity
France, La Hague	1,700
UK, Sellafield (THORP)	900
Russia, Ozersk (Mayak)	400
Japan (Rokkasho)	800
Total Light Water Reactor	**3,800**
UK, Sellafield (Magnox)	1,500
India	275
Total other	**1,775**
Total	**5,575**

Source: WNA

In total we expect secondary sources to decline ~7% per annum to 2018

As shown in Figure 41, we expect secondary sources of uranium to decline 7% per annum to ~10kt of U equivalent by 2018. The primary cause of the decline is expected to be the reduction of Russian weapons grade material in 2013.

Figure 41: Secondary sources of uranium [kt of U]



Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

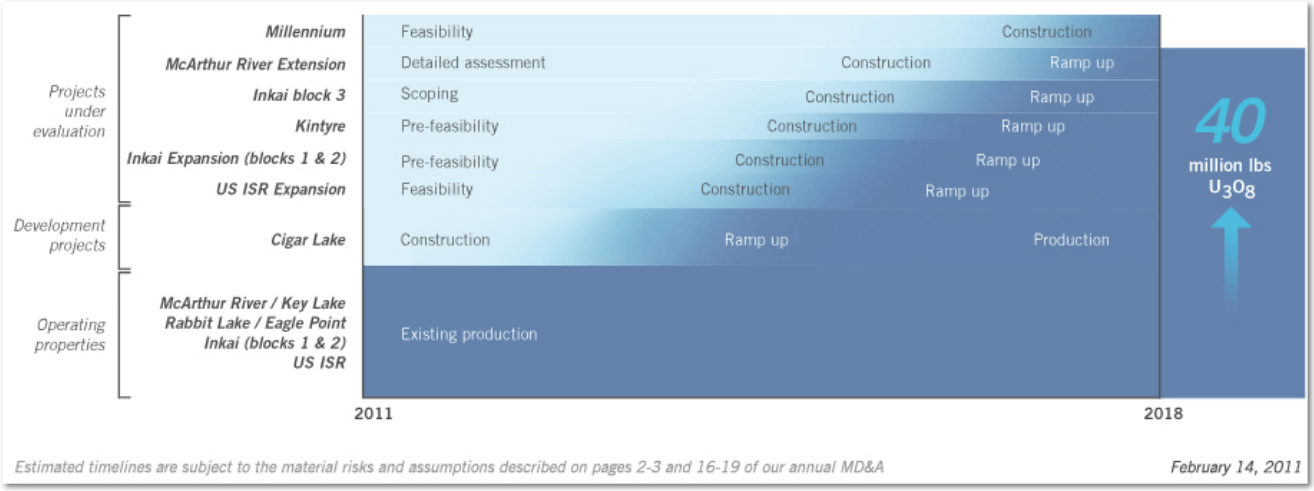
Appendix 3 – supply by company

Our supply forecasts are conservative compared to company forecasts

CAMECO: Double U strategy to double production by 2018

Cameco reasserted itself as the largest uranium producer in 2010 after Areva had briefly surpassed the Canadian miner in 2009. Cameco remains committed to its so-called "Double U" strategy to double uranium production to 40mlbs by 2018. As shown in the slide below from a Cameco presentation, a number of brownfield and greenfield projects are expected to drive production higher.

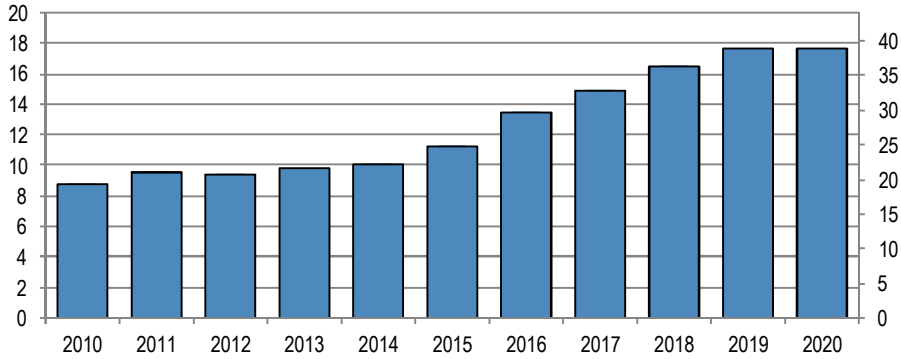
Figure 42: Cameco's Double U strategy



Source: Cameco

Figure 43 shows our implied production forecasts for Cameco generated from our bottom up mine-by-mine model. As shown, the model implies Cameco achieves only 36mlbs of U_3O_8 production in 2018, compared to its 40mlbs target.

Figure 43: Cameco production forecasts [kt U_3O_8 LHS, mlbs RHS]

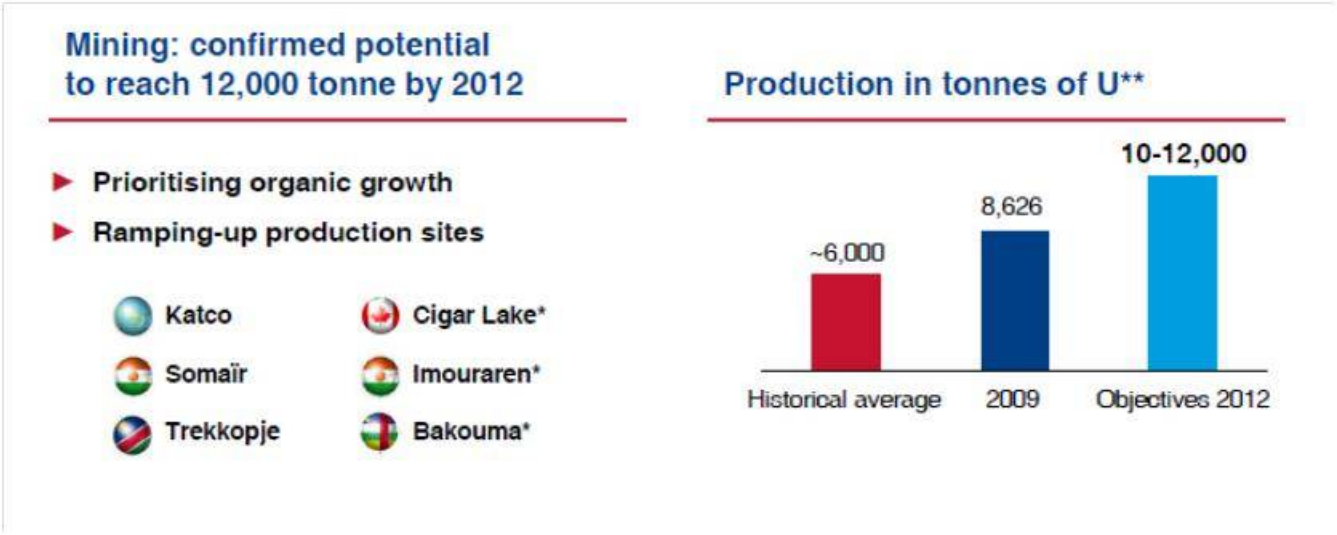


Source: J.P. Morgan estimates.

AREVA: Previously suggested growth between 16% and 40% by 2012

In April 2010, Areva confirmed its target to reach 12,000 tonnes of uranium production by 2012 (~14,000 tonnes of uranium oxide).

Figure 44: Areva's 2012 objectives

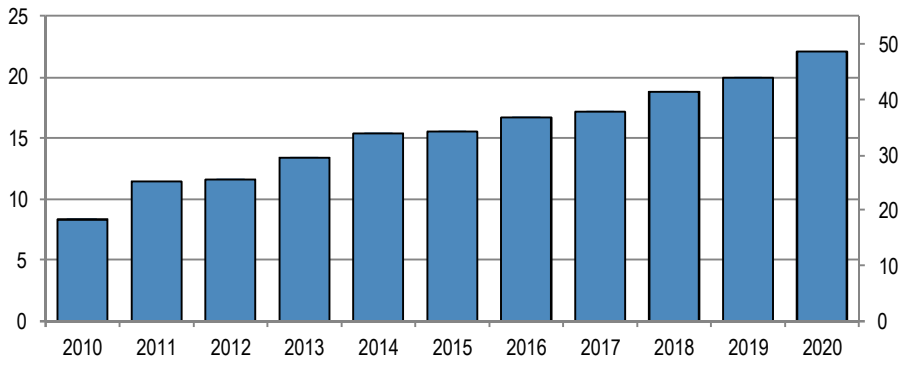


Source: AREVA Presentation - April 2010

We know of no updates to the 2012 objectives; however, in November 2011, AREVA announced that it had suspended its uranium mining project in the Central African Republic for two years, following a fall in uranium prices after the Fukushima disaster. Exploitation of the Bakouma mine, initially scheduled for 2010, then postponed to 2011, is at present unprofitable for the company, Jean Francois Milian, director general of Areva resources in Central African Republic, told a news conference.

Our estimates imply less than 10,000 tonnes of uranium production in 2012. We project further growth beyond 2012 as Areva's interests in mines in Canada, Niger and Namibia are developed.

Figure 45: Areva production forecasts [kt U_3O_8 LHS, mlbs U_3O_8 RHS]



Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

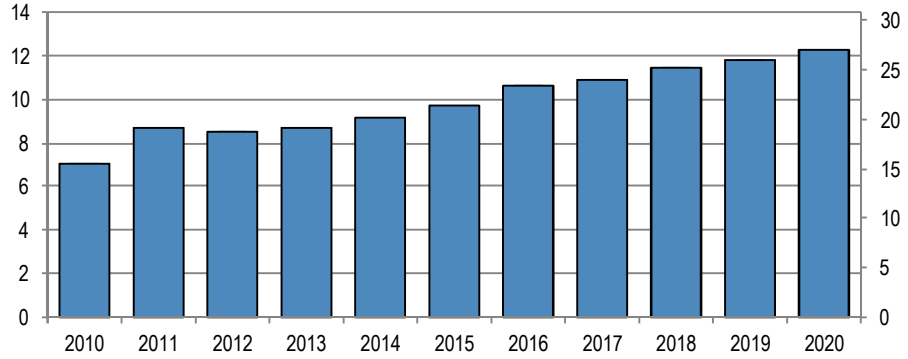
KAZATOMPROM: Reining in production growth in the face of falling prices

In 2008, Kazatomprom announced that it aimed to supply 30% of the world uranium by 2015, and through joint ventures: 12% of uranium conversion market, 6% of enrichment, and 30% of the fuel fabrication market by then. This would imply total production of ~22kt U by 2015.

However, as we mentioned on page 29, more recently Sergei Dara, Director of Strategic Development and International Projects at Kazatomprom, said that Kazakhstan had stabilized production to around 20,000 metric tons annually in order to avoid further depressing prices.

In August 2011, Kazatomprom announced that its share of production for the first half of the year was 5.2kt U. Our production forecasts for Kazatomprom are shown below. As shown, we expect flat production from the state-owned enterprise for the next three years.

Figure 46: Kazatomprom production forecasts [kt U LHS, mlbs U_3O_8 RHS]



Source: J.P. Morgan estimates.

RIO TINTO: Previously indicated that it would look to double production by 2015

As recently as 2009, the company indicated that it intended to double uranium production over the next five years.

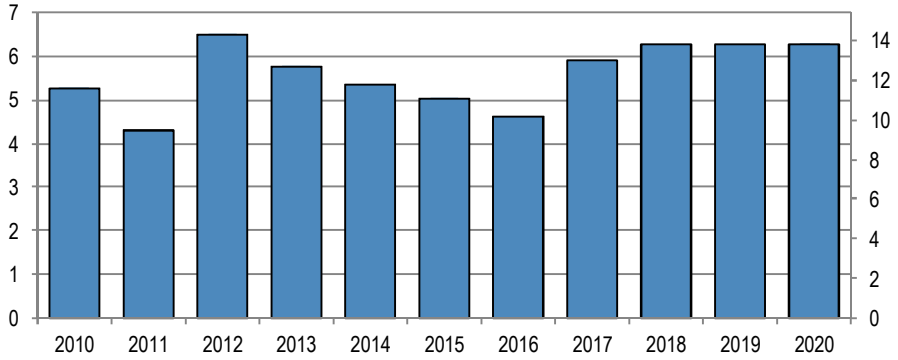
Central to this strategy is Rössing, where the open pit is being extended to mine additional ore; and processing capacity is to be lifted to 17mtpa by 2013 from 16mtpa currently. Furthermore, Rössing commissioned a heap leach test project in 2008, to try out a low cost method of extracting uranium oxide from broken ore.

ERA also has growth plans with the expectation of an underground operation likely to increase production at Ranger given higher grades.

As shown in Figure 47, we forecast Rio Tinto's uranium production to decline for the next five years as the Ranger open-cut mine is depleted. However, the introduction of the underground mine by 2016/17 should result in some production growth.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 47: Rio Tinto production forecasts [kt U LHS, mlbs U_3O_8 RHS]



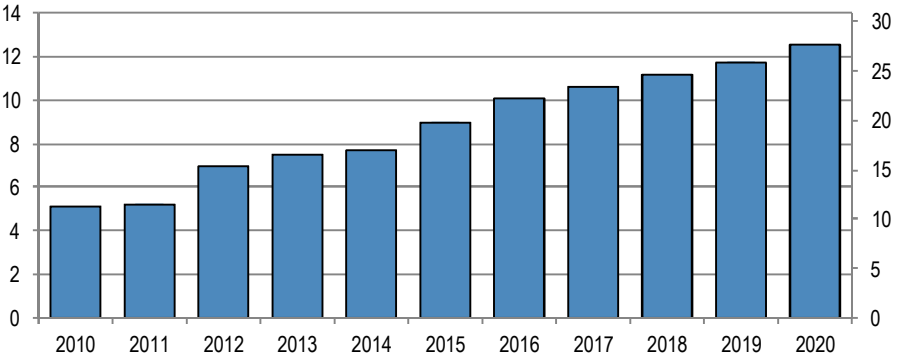
Source: J.P. Morgan estimates.

ARMZ: Looking to triple production by 2015

In 2008 ARMZ said that it intended to triple production to 10,300 tU per year by 2015, with some help from Cameco, Mitsui and local investors. ARMZ indicated that it planned to invest RUB 203 billion (US$ 6.1billion) in the development of uranium mining in Russia in 2008-2015. The company also aims for 20,000 tU per year by 2024.

As shown below, we forecast production from ARMZ of 9.0kt U_3O_8 (7.6kt of U) in 2015.

Figure 48: ARMZ production forecasts [kt U LHS, mlbs U_3O_8 RHS]



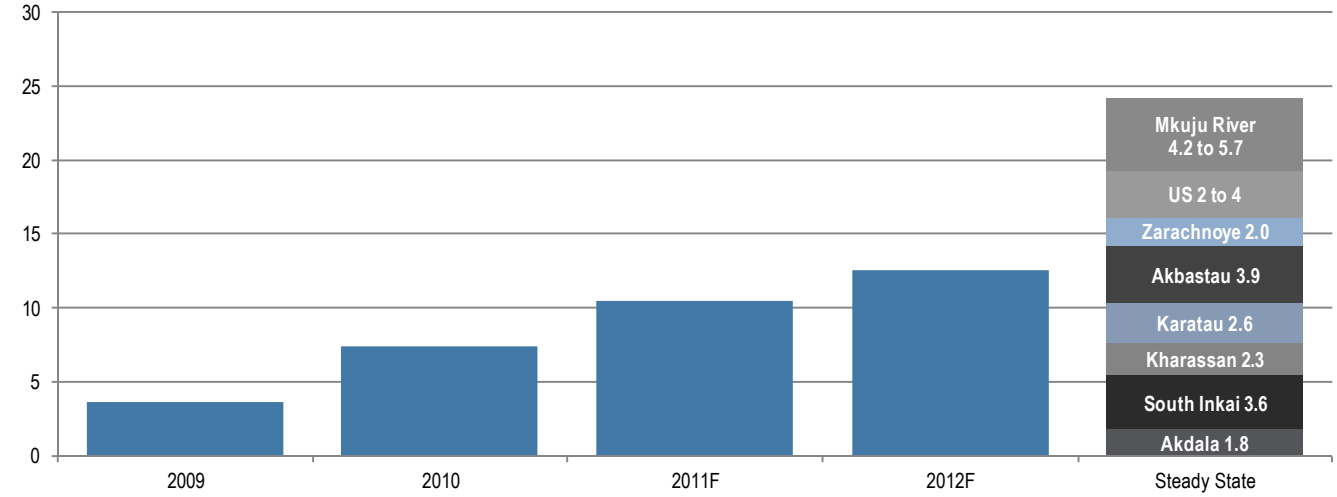
Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

URANIUM ONE: Substantial growth expected through acquisitions

Uranium One has guided to attributable production of 12.5mlbs U_3O_8 in 2012 ramping up to steady-state production of 22 to 26mlbs.

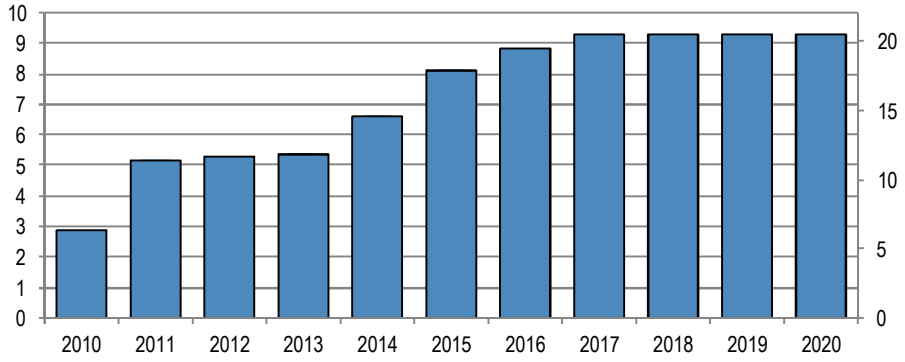
Figure 49: Uranium One production forecasts



Source: Company reports.

Based on our uranium mine production forecasts, we only assume 11.6mlbs of production in 2012, ramping up to 20mlbs by 2017/18.

Figure 50: ARMZ production forecasts [kt U LHS, mlbs U_3O_8 RHS]



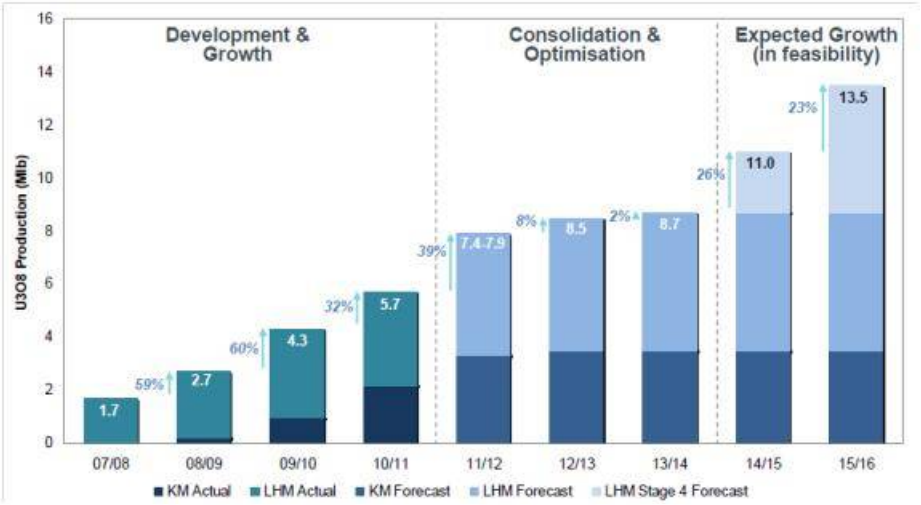
Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

PALADIN: Building a pipeline of growth projects

As shown in Figure 50 below, Paladin has ambitious growth plans and is targeting 13.5mlbs U_3O_8 production by FY2016.

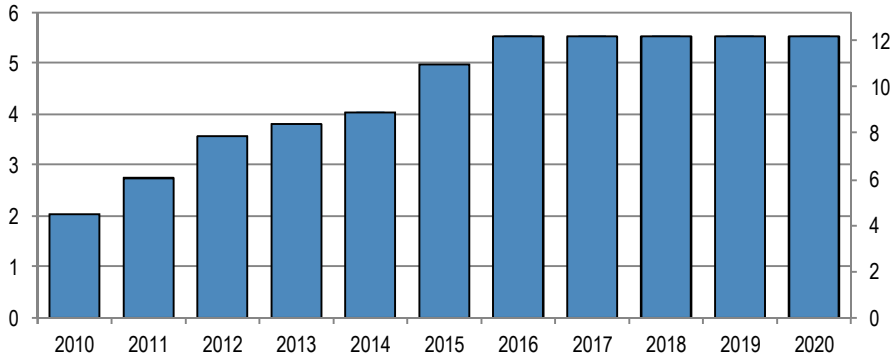
Figure 51: Paladin production forecasts [kt U LHS, mlbs U_3O_8 RHS]



Source: Company presentation in September 2011

The forecasts we have used in the supply model are again significantly lower than guidance as shown below.

Figure 52: Paladin production forecasts [kt U LHS, mlbs U_3O_8 RHS]



Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Appendix 3 – incentive price calculations

Figure 53: Incentive price analysis - Cigar Lake

				Incentive price:	58														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	61																	
	US$m	1100																	
Op-ex	US$/lb	35																	
Capacity	mlbs/yr	18																	
Life	years	13																	
Tax rate	%	27%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58	58
Production	mlbs U3O8			9.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	0.0	0.0	0.0
Revenue	**US$m**			**520**	**1040**	**1040**	**1040**	**1040**	**1040**	**1040**	**1040**	**1040**	**1040**	**1040**	**1040**	**1040**	**0**	**0**	**0**
Op-ex	US$/lb			34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	0	0	0
	US$m			-311	-621	-621	-621	-621	-621	-621	-621	-621	-621	-621	-621	-621	0	0	0
Royalty	US$m			-26	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52	0	0	0
EBITDA	US$m			183	367	367	367	367	367	367	367	367	367	367	367	367	0	0	0
Depreciation	US$m			-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	0	0	0
EBIT	US$m			98	281	281	281	281	281	281	281	281	281	281	281	281	0	0	0
Tax	US$m			-26	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	-76	0	0	0
NPAT	US$m			72	205	205	205	205	205	205	205	205	205	205	205	205	0	0	0
Cap-ex	US$m	-550	-550	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	-85	0	0	0
FCF	US$m	-550	-550	72	205	205	205	205	205	205	205	205	205	205	205	205	0	0	0
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 54: Incentive price analysis - Elkon

				Incentive price:	136														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	269																	
	US$m	3500																	
Op-ex	US$/lb	69																	
Capacity	mlbs/yr	13																	
Life	years	58																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136
Production	mlbs U3O8			6.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Revenue	**US$m**			**883**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**	**1766**
Op-ex	US$/lb			69	69	69	69	69	69	69	69	69	69	69	69	69	69	69	69
	US$m			-449	-897	-897	-897	-897	-897	-897	-897	-897	-897	-897	-897	-897	-897	-897	-897
Royalty	US$m			-44	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88	-88
EBITDA	US$m			390	781	781	781	781	781	781	781	781	781	781	781	781	781	781	781
Depreciation	US$m			-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61
EBIT	US$m			330	720	720	720	720	720	720	720	720	720	720	720	720	720	720	720
Tax	US$m			-99	-216	-216	-216	-216	-216	-216	-216	-216	-216	-216	-216	-216	-216	-216	-216
NPAT	US$m			231	504	504	504	504	504	504	504	504	504	504	504	504	504	504	504
Cap-ex	US$m	-1750	-1750	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61	-61
FCF	US$m	-1750	-1750	231	504	504	504	504	504	504	504	504	504	504	504	504	504	504	504
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 55: Incentive price analysis - Etango

				Incentive price:	92														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	93																	
	US$m	555																	
Op-ex	US$/lb	63																	
Capacity	mlbs/yr	6																	
Life	years	25																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92	92
Production	mlbs U3O8			3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Revenue	**US$m**			**275**	**550**	**550**	**550**	**550**	**550**	**550**	**550**	**550**	**550**	**550**	**550**	**550**	**550**	**550**	**550**
Op-ex	US$/lb			63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25	63.25
	US$m			-190	-380	-380	-380	-380	-380	-380	-380	-380	-380	-380	-380	-380	-380	-380	-380
Royalty	US$m			-14	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28	-28
EBITDA	US$m			72	143	143	143	143	143	143	143	143	143	143	143	143	143	143	143
Depreciation	US$m			-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22
EBIT	US$m			49	121	121	121	121	121	121	121	121	121	121	121	121	121	121	121
Tax	US$m			-15	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36
NPAT	US$m			35	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
Cap-ex	US$m	-278	-278	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22
FCF	US$m	-278	-278	35	85	85	85	85	85	85	85	85	85	85	85	85	85	85	85
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 56: Incentive price analysis – Four Mile

				Incentive price:	53														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	38																	
	US$m	100																	
Op-ex	US$/lb	38																	
Capacity	mlbs/yr	3																	
Life	years	15																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53	53
Production	mlbs U3O8			1.3	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	0.0
Revenue	**US$m**			**69**	**137**	**137**	**137**	**137**	**137**	**137**	**137**	**137**	**137**	**137**	**137**	**137**	**137**	**137**	**0**
Op-ex	US$/lb			37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	0
	US$m			-49	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	0
Royalty	US$m			-3	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	0
EBITDA	US$m			16	32	32	32	32	32	32	32	32	32	32	32	32	32	32	0
Depreciation	US$m			-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	0
EBIT	US$m			9	25	25	25	25	25	25	25	25	25	25	25	25	25	25	0
Tax	US$m			-3	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	-8	0
NPAT	US$m			6	18	18	18	18	18	18	18	18	18	18	18	18	18	18	0
Cap-ex	US$m	-50	-50	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	0
FCF	US$m	-50	-50	6	18	18	18	18	18	18	18	18	18	18	18	18	18	18	0
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 57: Incentive price analysis – Honeymoon

				Incentive price:	101														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	166																	
	US$m	146																	
Op-ex	US$/lb	49																	
Capacity	mlbs/yr	1																	
Life	years	20																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101	101
Production	mlbs U3O8			0.4	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Revenue	**US$m**			**44**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**	**89**
Op-ex	US$/lb			49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45
	US$m			-22	-44	-44	-44	-44	-44	-44	-44	-44	-44	-44	-44	-44	-44	-44	-44
Royalty	US$m			-2	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4	-4
EBITDA	US$m			20	41	41	41	41	41	41	41	41	41	41	41	41	41	41	41
Depreciation	US$m			-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
EBIT	US$m			13	33	33	33	33	33	33	33	33	33	33	33	33	33	33	33
Tax	US$m			-4	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10
NPAT	US$m			9	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
Cap-ex	US$m	-73	-73	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7
FCF	US$m	-73	-73	9	23	23	23	23	23	23	23	23	23	23	23	23	23	23	23
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 58: Incentive price analysis – Husab

				Incentive price:	76														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	96																	
	US$m	1430																	
Op-ex	US$/lb	39																	
Capacity	mlbs/yr	15																	
Life	years	16																	
Tax rate	%	38%																	
Royalty rate	%	6%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Production	mlbs U3O8			7.4	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8	14.8
Revenue	**US$m**			**563**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**	**1126**
Op-ex	US$/lb			39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1	39.1
	US$m			-290	-579	-579	-579	-579	-579	-579	-579	-579	-579	-579	-579	-579	-579	-579	-579
Royalty	US$m			-34	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68	-68
EBITDA	US$m			240	479	479	479	479	479	479	479	479	479	479	479	479	479	479	479
Depreciation	US$m			-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89
EBIT	US$m			150	390	390	390	390	390	390	390	390	390	390	390	390	390	390	390
Tax	US$m			-56	-146	-146	-146	-146	-146	-146	-146	-146	-146	-146	-146	-146	-146	-146	-146
NPAT	US$m			94	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
Cap-ex	US$m	-715	-715	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89
FCF	US$m	-715	-715	94	244	244	244	244	244	244	244	244	244	244	244	244	244	244	244
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 59: Incentive price analysis – Imouraren

				Incentive price:	84														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	108																	
	US$m	1400																	
Op-ex	US$/lb	53																	
Capacity	mlbs/yr	13																	
Life	years	30																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
Production	mlbs U3O8			6.5	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
Revenue	**US$m**			**543**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**	**1086**
Op-ex	US$/lb			52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9
	US$m			-344	-688	-688	-688	-688	-688	-688	-688	-688	-688	-688	-688	-688	-688	-688	-688
Royalty	US$m			-27	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54
EBITDA	US$m			172	344	344	344	344	344	344	344	344	344	344	344	344	344	344	344
Depreciation	US$m			-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47
EBIT	US$m			125	297	297	297	297	297	297	297	297	297	297	297	297	297	297	297
Tax	US$m			-38	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89
NPAT	US$m			88	208	208	208	208	208	208	208	208	208	208	208	208	208	208	208
Cap-ex	US$m	-700	-700	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47	-47
FCF	US$m	-700	-700	88	208	208	208	208	208	208	208	208	208	208	208	208	208	208	208
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 60: Incentive price analysis – Jabiluka

				Incentive price:	57														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	75																	
	US$m	909																	
Op-ex	US$/lb	35																	
Capacity	mlbs/yr	12																	
Life	years	25																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Production	mlbs U3O8			6.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1	12.1
Revenue	**US$m**			**343**	**687**	**687**	**687**	**687**	**687**	**687**	**687**	**687**	**687**	**687**	**687**	**687**	**687**	**687**	**687**
Op-ex	US$/lb			34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5
	US$m			-209	-418	-418	-418	-418	-418	-418	-418	-418	-418	-418	-418	-418	-418	-418	-418
Royalty	US$m			-17	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34	-34
EBITDA	US$m			117	234	234	234	234	234	234	234	234	234	234	234	234	234	234	234
Depreciation	US$m			-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36
EBIT	US$m			81	198	198	198	198	198	198	198	198	198	198	198	198	198	198	198
Tax	US$m			-24	-59	-59	-59	-59	-59	-59	-59	-59	-59	-59	-59	-59	-59	-59	-59
NPAT	US$m			57	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
Cap-ex	US$m	-455	-455	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36
FCF	US$m	-455	-455	57	139	139	139	139	139	139	139	139	139	139	139	139	139	139	139
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 61: Incentive price analysis – Kiggavik

				Incentive price:	107														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	192																	
	US$m	1500																	
Op-ex	US$/lb	49																	
Capacity	mlbs/yr	8																	
Life	years	20																	
Tax rate	%	27%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107	107
Production	mlbs U3O8			3.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8	7.8
Revenue	**US$m**			**415**	**831**	**831**	**831**	**831**	**831**	**831**	**831**	**831**	**831**	**831**	**831**	**831**	**831**	**831**	**831**
Op-ex	US$/lb			49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45
	US$m			-193	-386	-386	-386	-386	-386	-386	-386	-386	-386	-386	-386	-386	-386	-386	-386
Royalty	US$m			-21	-42	-42	-42	-42	-42	-42	-42	-42	-42	-42	-42	-42	-42	-42	-42
EBITDA	US$m			202	404	404	404	404	404	404	404	404	404	404	404	404	404	404	404
Depreciation	US$m			-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75
EBIT	US$m			127	329	329	329	329	329	329	329	329	329	329	329	329	329	329	329
Tax	US$m			-34	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89	-89
NPAT	US$m			93	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
Cap-ex	US$m	-750	-750	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75	-75
FCF	US$m	-750	-750	93	240	240	240	240	240	240	240	240	240	240	240	240	240	240	240
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 62: Incentive price analysis – Kintyre

				Incentive price:	70														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	100																	
	US$m	441																	
Op-ex	US$/lb	35																	
Capacity	mlbs/yr	4																	
Life	years	15																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70	70
Production	mlbs U3O8			2.2	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	0.0
Revenue	**US$m**			**154**	**307**	**307**	**307**	**307**	**307**	**307**	**307**	**307**	**307**	**307**	**307**	**307**	**307**	**307**	**0**
Op-ex	US$/lb			34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	0
	US$m			-76	-152	-152	-152	-152	-152	-152	-152	-152	-152	-152	-152	-152	-152	-152	0
Royalty	US$m			-8	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	-15	0
EBITDA	US$m			70	140	140	140	140	140	140	140	140	140	140	140	140	140	140	0
Depreciation	US$m			-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	0
EBIT	US$m			40	110	110	110	110	110	110	110	110	110	110	110	110	110	110	0
Tax	US$m			-12	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	0
NPAT	US$m			28	77	77	77	77	77	77	77	77	77	77	77	77	77	77	0
Cap-ex	US$m	-221	-221	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	0
FCF	US$m	-221	-221	28	77	77	77	77	77	77	77	77	77	77	77	77	77	77	0
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 63: Incentive price analysis – Marenica

				Incentive price:	86														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	74																	
	US$m	260																	
Op-ex	US$/lb	53																	
Capacity	mlbs/yr	4																	
Life	years	13																	
Tax rate	%	38%																	
Royalty rate	%	6%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Production	mlbs U3O8			1.8	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	0.0	0.0	0.0
Revenue	**US$m**			**150**	**301**	**301**	**301**	**301**	**301**	**301**	**301**	**301**	**301**	**301**	**301**	**301**	**0**	**0**	**0**
Op-ex	US$/lb			52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	52.9	0	0	0
	US$m			-93	-185	-185	-185	-185	-185	-185	-185	-185	-185	-185	-185	-185	0	0	0
Royalty	US$m			-9	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	0	0	0
EBITDA	US$m			49	97	97	97	97	97	97	97	97	97	97	97	97	0	0	0
Depreciation	US$m			-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	0	0	0
EBIT	US$m			29	77	77	77	77	77	77	77	77	77	77	77	77	0	0	0
Tax	US$m			-11	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	-29	0	0	0
NPAT	US$m			18	48	48	48	48	48	48	48	48	48	48	48	48	0	0	0
Cap-ex	US$m	-130	-130	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	0	0	0
FCF	US$m	-130	-130	18	48	48	48	48	48	48	48	48	48	48	48	48	0	0	0
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 64: Incentive price analysis – Michelin

				Incentive price:	84														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	135																	
	US$m	984																	
Op-ex	US$/lb	48																	
Capacity	mlbs/yr	7																	
Life	years	30																	
Tax rate	%	27%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84	84
Production	mlbs U3O8			3.7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Revenue	**US$m**			**308**	**617**	**617**	**617**	**617**	**617**	**617**	**617**	**617**	**617**	**617**	**617**	**617**	**617**	**617**	**617**
Op-ex	US$/lb			48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3	48.3
	US$m			-176	-353	-353	-353	-353	-353	-353	-353	-353	-353	-353	-353	-353	-353	-353	-353
Royalty	US$m			-15	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31	-31
EBITDA	US$m			117	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
Depreciation	US$m			-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
EBIT	US$m			84	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201
Tax	US$m			-23	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54	-54
NPAT	US$m			61	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
Cap-ex	US$m	-492	-492	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
FCF	US$m	-492	-492	61	146	146	146	146	146	146	146	146	146	146	146	146	146	146	146
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 65: Incentive price analysis – Midwest

				Incentive price:	76														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	82																	
	US$m	653																	
Op-ex	US$/lb	52																	
Capacity	mlbs/yr	8																	
Life	years	25																	
Tax rate	%	27%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76	76
Production	mlbs U3O8			4.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Revenue	**US$m**			**303**	**607**	**607**	**607**	**607**	**607**	**607**	**607**	**607**	**607**	**607**	**607**	**607**	**607**	**607**	**607**
Op-ex	US$/lb			51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75	51.75
	US$m			-207	-414	-414	-414	-414	-414	-414	-414	-414	-414	-414	-414	-414	-414	-414	-414
Royalty	US$m			-15	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30	-30
EBITDA	US$m			81	163	163	163	163	163	163	163	163	163	163	163	163	163	163	163
Depreciation	US$m			-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
EBIT	US$m			55	136	136	136	136	136	136	136	136	136	136	136	136	136	136	136
Tax	US$m			-15	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37	-37
NPAT	US$m			40	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
Cap-ex	US$m	-326	-326	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
FCF	US$m	-326	-326	40	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 66: Incentive price analysis – Millennium

				Incentive price:	73														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	100																	
	US$m	600																	
Op-ex	US$/lb	46																	
Capacity	mlbs/yr	6																	
Life	years	30																	
Tax rate	%	27%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
Production	mlbs U3O8			3.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Revenue	**US$m**			**220**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**	**440**
Op-ex	US$/lb			46	46	46	46	46	46	46	46	46	46	46	46	46	46	46	46
	US$m			-138	-276	-276	-276	-276	-276	-276	-276	-276	-276	-276	-276	-276	-276	-276	-276
Royalty	US$m			-11	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22
EBITDA	US$m			71	142	142	142	142	142	142	142	142	142	142	142	142	142	142	142
Depreciation	US$m			-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
EBIT	US$m			51	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
Tax	US$m			-14	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33	-33
NPAT	US$m			37	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
Cap-ex	US$m	-300	-300	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20	-20
FCF	US$m	-300	-300	37	89	89	89	89	89	89	89	89	89	89	89	89	89	89	89
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 67: Incentive price analysis – Mkuju River

				Incentive price:	86														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	116																	
	US$m	430																	
Op-ex	US$/lb	40																	
Capacity	mlbs/yr	4																	
Life	years	12																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86	86
Production	mlbs U3O8			1.9	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0
Revenue	**US$m**			**160**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**320**	**0**	**0**	**0**	**0**
Op-ex	US$/lb			40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	0	0	0	0
	US$m			-74	-149	-149	-149	-149	-149	-149	-149	-149	-149	-149	-149	0	0	0	0
Royalty	US$m			-8	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	-16	0	0	0	0
EBITDA	US$m			78	155	155	155	155	155	155	155	155	155	155	155	0	0	0	0
Depreciation	US$m			-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	0	0	0	0
EBIT	US$m			42	119	119	119	119	119	119	119	119	119	119	119	0	0	0	0
Tax	US$m			-13	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	0	0	0	0
NPAT	US$m			29	83	83	83	83	83	83	83	83	83	83	83	0	0	0	0
Cap-ex	US$m	-215	-215	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	-36	0	0	0	0
FCF	US$m	-215	-215	29	83	83	83	83	83	83	83	83	83	83	83	0	0	0	0
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 68: Incentive price analysis – Novokonstantinovskoye

				Incentive price:	73														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	120																	
	US$m	780																	
Op-ex	US$/lb	40																	
Capacity	mlbs/yr	7																	
Life	years	30																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73	73
Production	mlbs U3O8			3.3	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5	6.5
Revenue	**US$m**			**239**	**477**	**477**	**477**	**477**	**477**	**477**	**477**	**477**	**477**	**477**	**477**	**477**	**477**	**477**	**477**
Op-ex	US$/lb			40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25	40.25
	US$m			-131	-262	-262	-262	-262	-262	-262	-262	-262	-262	-262	-262	-262	-262	-262	-262
Royalty	US$m			-12	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24	-24
EBITDA	US$m			96	192	192	192	192	192	192	192	192	192	192	192	192	192	192	192
Depreciation	US$m			-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
EBIT	US$m			70	166	166	166	166	166	166	166	166	166	166	166	166	166	166	166
Tax	US$m			-21	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50	-50
NPAT	US$m			49	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
Cap-ex	US$m	-390	-390	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26	-26
FCF	US$m	-390	-390	49	116	116	116	116	116	116	116	116	116	116	116	116	116	116	116
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 69: Incentive price analysis – Ryst Kuil

				Incentive price:	102														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	100																	
	US$m	177																	
Op-ex	US$/lb	58																	
Capacity	mlbs/yr	2																	
Life	years	10																	
Tax rate	%	28%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102	102
Production	mlbs U3O8			0.9	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	0.0	0.0	0.0	0.0	0.0	0.0
Revenue	**US$m**			**91**	**181**	**181**	**181**	**181**	**181**	**181**	**181**	**181**	**181**	**0**	**0**	**0**	**0**	**0**	**0**
Op-ex	US$/lb			57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	57.5	0	0	0	0	0	0
	US$m			-51	-102	-102	-102	-102	-102	-102	-102	-102	-102	0	0	0	0	0	0
Royalty	US$m			-5	-9	-9	-9	-9	-9	-9	-9	-9	-9	0	0	0	0	0	0
EBITDA	US$m			35	71	71	71	71	71	71	71	71	71	0	0	0	0	0	0
Depreciation	US$m			-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	0	0	0	0	0	0
EBIT	US$m			18	53	53	53	53	53	53	53	53	53	0	0	0	0	0	0
Tax	US$m			-5	-15	-15	-15	-15	-15	-15	-15	-15	-15	0	0	0	0	0	0
NPAT	US$m			13	38	38	38	38	38	38	38	38	38	0	0	0	0	0	0
Cap-ex	US$m	-89	-89	-18	-18	-18	-18	-18	-18	-18	-18	-18	-18	0	0	0	0	0	0
FCF	US$m	-89	-89	13	38	38	38	38	38	38	38	38	38	0	0	0	0	0	0
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Figure 70: Incentive price analysis – Trekkopje

				Incentive price:	99														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	110																	
	US$m	956																	
Op-ex	US$/lb	49																	
Capacity	mlbs/yr	9																	
Life	years	12																	
Tax rate	%	38%																	
Royalty rate	%	6%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Production	mlbs U3O8			4.4	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	8.7	0.0	0.0	0.0	0.0
Revenue	**US$m**			**429**	**857**	**857**	**857**	**857**	**857**	**857**	**857**	**857**	**857**	**857**	**857**	**0**	**0**	**0**	**0**
Op-ex	US$/lb			49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	49.45	0	0	0	0
	US$m			-215	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	-430	0	0	0	0
Royalty	US$m			-26	-51	-51	-51	-51	-51	-51	-51	-51	-51	-51	-51	0	0	0	0
EBITDA	US$m			188	376	376	376	376	376	376	376	376	376	376	376	0	0	0	0
Depreciation	US$m			-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	0	0	0	0
EBIT	US$m			108	296	296	296	296	296	296	296	296	296	296	296	0	0	0	0
Tax	US$m			-41	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	-111	0	0	0	0
NPAT	US$m			68	185	185	185	185	185	185	185	185	185	185	185	0	0	0	0
Cap-ex	US$m	-478	-478	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	-80	0	0	0	0
FCF	US$m	-478	-478	68	185	185	185	185	185	185	185	185	185	185	185	0	0	0	0
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 71: Incentive price analysis – Valencia

				Incentive price:	99														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	88																	
	US$m	322																	
Op-ex	US$/lb	56																	
Capacity	mlbs/yr	4																	
Life	years	12																	
Tax rate	%	38%																	
Royalty rate	%	6%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
Production	mlbs U3O8			1.8	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	3.7	0.0	0.0	0.0	0.0
Revenue	**US$m**			**180**	**360**	**360**	**360**	**360**	**360**	**360**	**360**	**360**	**360**	**360**	**360**	**0**	**0**	**0**	**0**
Op-ex	US$/lb			56.35	56.35	56.35	56.35	56.35	56.35	56.35	56.35	56.35	56.35	56.35	56.35	0	0	0	0
	US$m			-103	-206	-206	-206	-206	-206	-206	-206	-206	-206	-206	-206	0	0	0	0
Royalty	US$m			-11	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	-22	0	0	0	0
EBITDA	US$m			66	132	132	132	132	132	132	132	132	132	132	132	0	0	0	0
Depreciation	US$m			-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	0	0	0	0
EBIT	US$m			39	106	106	106	106	106	106	106	106	106	106	106	0	0	0	0
Tax	US$m			-15	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	-40	0	0	0	0
NPAT	US$m			25	66	66	66	66	66	66	66	66	66	66	66	0	0	0	0
Cap-ex	US$m	-161	-161	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	0	0	0	0
FCF	US$m	-161	-161	25	66	66	66	66	66	66	66	66	66	66	66	0	0	0	0
NPV	US$m	16																	

Source: J.P. Morgan estimates.

Figure 72: Incentive price analysis – Yeelirrie

				Incentive price:	64														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	106																	
	US$m	817																	
Op-ex	US$/lb	35																	
Capacity	mlbs/yr	8																	
Life	years	30																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64	64
Production	mlbs U3O8			3.9	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7	7.7
Revenue	**US$m**			**246**	**492**	**492**	**492**	**492**	**492**	**492**	**492**	**492**	**492**	**492**	**492**	**492**	**492**	**492**	**492**
Op-ex	US$/lb			34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5	34.5
	US$m			-133	-266	-266	-266	-266	-266	-266	-266	-266	-266	-266	-266	-266	-266	-266	-266
Royalty	US$m			-12	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25
EBITDA	US$m			100	201	201	201	201	201	201	201	201	201	201	201	201	201	201	201
Depreciation	US$m			-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27
EBIT	US$m			73	174	174	174	174	174	174	174	174	174	174	174	174	174	174	174
Tax	US$m			-22	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52	-52
NPAT	US$m			51	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
Cap-ex	US$m	-409	-409	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27	-27
FCF	US$m	-409	-409	51	122	122	122	122	122	122	122	122	122	122	122	122	122	122	122
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Figure 73: Incentive price analysis – Zhalpak

				Incentive price:	57														
Hurdle rate	% REAL	12.5%																	
Capital cost	US$/lb	50																	
	US$m	130																	
Op-ex	US$/lb	38																	
Capacity	mlbs/yr	3																	
Life	years	15																	
Tax rate	%	30%																	
Royalty rate	%	5%																	
		T-2	T-1	T+0	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8	T+9	T+10	T+11	T+12	T+13	T+14	T+15
Price	US$/lb	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57	57
Production	mlbs U3O8			1.3	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	2.6	0.0
Revenue	**US$m**			**74**	**147**	**147**	**147**	**147**	**147**	**147**	**147**	**147**	**147**	**147**	**147**	**147**	**147**	**147**	**0**
Op-ex	US$/lb			37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	37.95	0
	US$m			-49	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	-99	0
Royalty	US$m			-4	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	-7	0
EBITDA	US$m			21	41	41	41	41	41	41	41	41	41	41	41	41	41	41	0
Depreciation	US$m			-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	0
EBIT	US$m			12	33	33	33	33	33	33	33	33	33	33	33	33	33	33	0
Tax	US$m			-4	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	-10	0
NPAT	US$m			8	23	23	23	23	23	23	23	23	23	23	23	23	23	23	0
Cap-ex	US$m	-65	-65	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	-9	0
FCF	US$m	-65	-65	8	23	23	23	23	23	23	23	23	23	23	23	23	23	23	0
NPV	US$m	0																	

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

J.P.Morgan

Figure 74: Summary financials - PDN

PDN Summary Financials - June year end (US$m)

Profit & Loss	2010	2011E	2012E	2013E	2014E	2015E
Revenue	204	269	417	585	722	877
Costs	-194	-276	-323	-335	-349	-403
EBITDA	10	-7	94	251	373	474
Depreciation & Amortisation	-14	-36	-38	-46	-47	-54
EBIT	-4	-44	56	204	326	420
Other	0	0	0	0	0	0
Interest	-21	-62	-42	-41	-39	-31
PBT	-26	-105	13	163	287	389
Tax	-28	17	-4	-49	-86	-117
Minorities & other	1	6	0	1	2	3
NPAT - adjusted	-53	-82	9	115	203	276
Exceptional items	0	0	-133	0	0	0
NPAT - reported	-53	-82	-124	115	203	276
Shares outstanding (millions)	670	771	854	854	854	854
EPS - adjusted	-7.8	-11.1	1.1	13.5	23.8	32.3
EPS - reported	-7.8	-11.1	-14.5	13.5	23.8	32.3
DPS	0.0	0.0	0.0	0.0	0.0	0.0

Segmented EBIT	2010	2011E	2012E	2013E	2014E	2015E
Uranium	-4	-44	56	204	326	420

Attributable Sales (Key Commc	2010	2011E	2012E	2013E	2014E	2015E
Uranium (mlbs)						
Langer Heinrich	3,352	3,525	4,224	5,200	5,225	6,225
Kayelekera	964	2,169	2,745	3,250	3,300	3,625
Total	4,316	5,694	6,970	8,450	8,525	9,850

Price Assumptions	2010	2011E	2012E	2013E	2014E	2015E
Uranium spot - US$/lb	43	56	55	71	82	86
Uranium term - US$/lb	61	65	65	75	87	92
Realised price - US$/lb	54	55	54	69	84	89
A$/US$ FX rate	0.88	0.99	1.05	1.00	0.89	0.84

Sensitivity Analysis	2010	2011E	2012E	2013E	2014E	2015E
% change in eps for a 10% change in:						
Uranium spot price		51.1%	30.1%	27.7%	28.2%	25.6%
Australian dollar		0.0%	0.0%	0.0%	0.0%	0.0%

Cashflow	2010	2011E	2012E	2013E	2014E	2015E
EBITDA	10	-7	94	251	373	474
Interest	-31	-32	-42	-41	-39	-31
Tax	-28	17	-4	-49	-86	-117
Other	7	-80	-10	-25	-21	-55
Cash from operations	**-42**	**-102**	**38**	**136**	**227**	**271**
Cap-ex	-170	-129	-71	-88	-132	-32
Other	-2	-3	0	0	0	0
Cash from investing	**-172**	**-133**	**-71**	**-88**	**-132**	**-32**
Proceeds from borrowings	138	-292	51	-48	-95	-239
Proceeds from equity	364	293	66	0	0	0
Dividends	0	0	0	0	0	0
Other	-7	0	0	0	0	0
Cash from financing	**495**	**1**	**116**	**-48**	**-95**	**-239**
Total cash flow	**281**	**-233**	**83**	**0**	**0**	**0**
Impact of FX	1	3	0	0	0	0
Changes in cash	283	-231	83	0	0	0
Cash at start of period	499	599	317	400	400	400
Cash at end of period	**781**	**368**	**400**	**400**	**400**	**400**
Free cash flow	-212	-231	-34	48	95	239

Balance Sheet	2010	2011E	2012E	2013E	2014E	2015E
Cash and cash equivalents	348	117	200	200	200	200
Trade and other receivables	33	21	35	49	64	72
Inventories	109	178	210	227	236	313
Other	26	14	14	14	14	14
Total current assets	516	329	459	490	514	598
Total non-current assets	1,442	2,074	1,974	2,016	2,101	2,079
Total assets	**1,958**	**2,404**	**2,433**	**2,506**	**2,615**	**2,677**
Trade and other payables	63	70	106	113	116	145
Other current liabilities	58	49	49	49	49	49
Total current liabilities	121	119	155	162	165	194
Interest bearing liabilities	682	676	726	679	584	345
Other non-current liabilities	198	254	254	254	254	254
Total non-current liabilities	880	930	980	933	838	599
Total liabilities	1,001	1,049	1,136	1,095	1,003	793
Net assets	**956**	**1,355**	**1,297**	**1,411**	**1,612**	**1,884**
Share capital	1,475	1,768	1,834	1,834	1,834	1,834
Retained earnings	-591	-497	-620	-505	-302	-26
Minorities	73	84	84	83	80	77
Other	0	0	0	0	0	0
Total equity	**956**	**1,355**	**1,297**	**1,411**	**1,612**	**1,884**
Net cash (debt)	-334	-558	-526	-479	-384	-145
Total debt	730	720	770	723	628	389

Valuation (10% discount rate)	2010	2011E	2012E	2013E	2014E	2015E
Langer Heinrich	1,439	1,622	1,805	1,894	1,999	1,982
Kayelekera	466	526	586	589	597	532
Corporate	-282	-243	-188	-185	-183	-180
Unexplored assets	317	605	610	626	641	657
Investments	56	66	68	57	56	51
Enterprise valuation	1,997	2,577	2,882	2,982	3,110	3,042
Net debt	258	435	574	490	447	262
Equity valuation	1,739	2,141	2,307	2,491	2,664	2,780
per share - US$/shr	2.46	2.69	2.70	2.92	3.12	3.25
per share - A$/shr	3.03	3.22	3.25	3.56	3.83	4.07

Key Ratios	2010	2011E	2012E	2013E	2014E	2015E
Sales revenue growth		31.6%	55.1%	40.4%	23.3%	21.5%
EBITDA / sales margin	4.9%	-2.8%	22.5%	42.8%	51.7%	54.1%
EBIT / sales margin	-2.1%	-16.2%	13.3%	34.9%	45.2%	47.9%
ROA (EBIT/Assets)	-0.2%	-2.0%	2.3%	8.3%	12.7%	15.9%
ROE (NPAT/Equity)	-5.5%	-7.1%	0.7%	8.5%	13.5%	15.8%
Net debt / net debt + equity	25.9%	29.2%	28.9%	25.3%	19.2%	7.1%
Net interest cover	-0.2	-0.7	1.3	4.9	8.4	13.5

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

J.P.Morgan

Figure 75: Summary financials - ERA

ERA Summary Financials - December year end (A$m)

Profit & Loss	2009	2010	2011E	2012E	2013E	2014E
Revenue	781	586	601	611	615	604
Costs	-321	-450	-531	-407	-383	-371
EBITDA	460	136	70	204	232	234
Depreciation & Amortisation	-67	-61	-124	-232	-174	-139
EBIT	393	75	-55	-28	58	94
Other	0	0	0	0	0	0
Interest	-11	-16	-16	-10	-10	-11
PBT	382	59	-70	-38	47	84
Tax	-109	-12	23	11	-14	-25
Minorities & other	0	0	0	0	0	0
NPAT - adjusted	273	47	-47	-27	33	59
Exceptional items	0	0	-99	0	0	0
NPAT - reported	273	47	-146	-27	33	59
Shares outstanding (millions)	191	191	354	518	518	518
EPS - adjusted	142.9	24.6	-16.6	-5.1	6.4	11.3
EPS - reported	142.9	24.6	-41.2	-5.1	6.4	11.3
DPS	39.0	8.0	0.0	0.0	0.0	0.0

Segmented EBIT	2009	2010E	2011E	2012E	2013E	2014E
Uranium	393	75	-55	-28	58	94

Attributable Sales (Key Commc	2009	2010	2011E	2012E	2013E	2014E
Uranium - klbs						
Ranger	12,119	11,080	9,921	9,522	7,143	5,714

Price Assumptions	2009	2010	2011E	2012E	2013E	2014E
Uranium spot - US$/lb	45	46	57	64	73	91
Uranium term - US$/lb	66	61	66	69	78	96
Realised price - US$/lb	51	48	61	68	75	90
A$/US$ FX rate	0.80	0.92	1.03	1.09	0.90	0.88

Sensitivity Analysis	2009	2010	2011E	2012E	2013E	2014E
% change in eps for a 10% change in:						
Uranium spot price		0.0%	0.0%	0.0%	0.0%	0.0%
Australian dollar		-11.9%	-23.1%	-19.7%	-19.5%	-23.5%

Cashflow	2009	2010	2011E	2012E	2013E	2014E
EBITDA	460	136	70	204	232	234
Interest	5	8	3	0	0	0
Tax	-132	-75	26	11	-14	-25
Other	-84	-27	55	21	4	3
Cash from operations	**249**	**42**	**154**	**237**	**222**	**211**
Cap-ex	-37	-45	-113	-250	-260	-123
Other	0	0	0	0	0	0
Cash from investing	**-37**	**-45**	**-113**	**-250**	**-260**	**-123**
Proceeds from borrowings	0	0	0	0	0	0
Proceeds from equity	0	0	0	0	0	0
Dividends	-65	-63	487	0	0	0
Other	0	0	0	0	0	0
Cash from financing	**-65**	**-63**	**487**	**0**	**0**	**0**
Total cash flow	**147**	**-66**	**528**	**-12**	**-38**	**88**
Impact of FX	0	0	0	0	0	0
Changes in cash	147	-66	528	-12	-38	88
Cash at start of period	107	254	188	716	703	665
Cash at end of period	**254**	**188**	**716**	**703**	**665**	**754**
Free cash flow	212	-3	41	-12	-38	88

Balance Sheet	2009	2010	2011E	2012E	2013E	2014E
Cash and cash equivalents	254	188	716	703	665	754
Trade and other receivables	60	73	78	69	68	67
Inventories	134	139	152	110	101	95
Other	1	13	3	3	3	3
Total current assets	449	412	949	886	837	919
Total non-current assets	910	1,011	995	966	1,005	940
Total assets	**1,359**	**1,423**	**1,944**	**1,853**	**1,842**	**1,859**
Trade and other payables	69	94	107	77	71	67
Other current liabilities	77	28	29	29	29	29
Total current liabilities	145	122	136	107	100	96
Interest bearing liabilities	0	0	0	0	0	0
Other non-current liabilities	247	351	516	481	444	406
Total non-current liabilities	247	351	516	481	444	406
Total liabilities	393	472	652	587	544	502
Net assets	**967**	**951**	**1,292**	**1,266**	**1,299**	**1,357**
Share capital	215	215	215	215	215	215
Retained earnings	752	736	1,078	1,051	1,084	1,143
Minorities	0	0	0	0	0	0
Other	0	0	0	0	0	0
Total equity	**967**	**951**	**1,292**	**1,266**	**1,299**	**1,357**
Net cash/(debt)	254	188	716	703	665	754
Total debt	0	0	0	0	0	0

Valuation 10% discount rate	2009	2010	2011E	2012E	2013E	2014E
Ranger	534	510	587	682	800	795
Jabiluka	117	108	99	93	114	117
Net debt (start of period)	-254	-188	-716	-703	-665	-754
Equity NPV - A$m	904	805	1,402	1,479	1,579	1,666
Equity NPV - A$/shr	4.74	4.22	2.71	2.86	3.05	3.22

Key Ratios	2009	2010	2011E	2012E	2013E	2014E
Sales revenue growth		-24.9%	2.6%	1.7%	0.6%	-1.7%
EBITDA / sales margin	58.9%	23.2%	11.6%	33.4%	37.7%	38.7%
EBIT / sales margin	50.4%	12.8%	-9.1%	-4.5%	9.4%	15.6%
ROA (EBIT/Assets)	28.9%	5.4%	-3.2%	-1.5%	3.1%	5.1%
ROE (NPAT/Equity)	28.2%	4.9%	-4.2%	-2.1%	2.6%	4.4%
Net debt / net debt + equity	-35.6%	-24.6%	-124.2%	-125.1%	-105.1%	-124.9%
Net interest cover	35.1	4.8	-3.5	-2.7	5.5	8.9

Source: J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

J.P.Morgan

Company Data	
52-week range (A$)	8.27 - 1.14
Market capitalisation (A$ bn)	0.60
Market capitalisation ($ bn)	0.61
Fiscal Year End	Dec
Price (A$)	1.15
Date Of Price	09 Jan 12
Shares outstanding (mn)	517.7
ASX100	3,356.9
ASX200-Res	4,467.3
NTA/Sh^ (A$)	2.50
Net Debt^ (A$ bn)	-0.72

Energy Resources of Australia Limited (Reuters: ERA.AX, Bloomberg: ERA AU)

Year-end Dec (A$)	FY09A	FY10A	FY11E	FY12E	FY13E
Total Revenue (A$ mn)	824.5	586.0	601.2	611.2	614.7
EBITDA (A$ mn)	452.2	135.9	69.8	204.4	231.7
Net profit after tax (A$ mn)	272.6	47.0	-145.9	-26.5	33.0
EPS (A$)	1.429	0.246	-0.685	-0.051	0.064
P/E (x)	0.8	4.7	NM	NM	18.0
Cash flow per share (A$)	1.332	0.221	0.297	0.458	0.428
Dividend (A$)	0.390	0.080	0.000	0.000	0.000
Net Yield (%)	33.9%	7.0%	0.0%	0.0%	0.0%
Normalised* EPS (A$)	1.429	0.246	-0.166	-0.051	0.064
Normalised* EPS chg (%)	129.5%	-82.8%	-167.4%	69.1%	224.5%
Normalised* P/E (x)	0.8	4.7	NM	NM	18.0

Source: Company data, Bloomberg, J.P. Morgan estimates.

Company Data	
52-week range (A$)	5.61 - 1.11
Market capitalisation (A$ bn)	1.14
Market capitalisation ($ bn)	1.16
Fiscal Year End	Jun
Price (A$)	1.36
Date Of Price	09 Jan 12
Shares outstanding (mn)	835.5
ASX100	3,356.9
ASX200-Res	4,467.3
NTA/Sh^ ($)	1.53
Net Debt^ ($ bn)	0.53

Paladin Energy Ltd (Reuters: PDN.AX, Bloomberg: PDN AU)

Year-end Jun (US$)	FY09A	FY10A	FY11A	FY12E	FY13E
Total Revenue ($ mn)	113.2	211.8	267.5	415.0	583.4
EBITDA ($ mn)	-776.9	8.0	-8.9	91.9	248.5
Net profit after tax ($ mn)	-480.3	-52.9	-82.3	-123.6	115.0
EPS ($)	-0.776	-0.076	-0.111	-0.145	0.135
P/E (x)	NM	NM	NM	NM	10.3
Cash flow per share ($)	-0.013	-0.037	-0.136	0.045	0.162
Dividend ($)	0.000	0.000	0.000	0.000	0.000
Net Yield (%)	0.0%	0.0%	0.0%	0.0%	0.0%
Normalised* EPS ($)	0.131	-0.076	-0.111	0.011	0.135
Normalised* EPS chg (%)	319.4%	-158.4%	-45.6%	109.9%	1130.2%
Normalised* P/E (x)	10.7	NM	NM	127.6	10.3

Source: Company data, Bloomberg, J.P. Morgan estimates.

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

J.P.Morgan

JPM Q-Profile

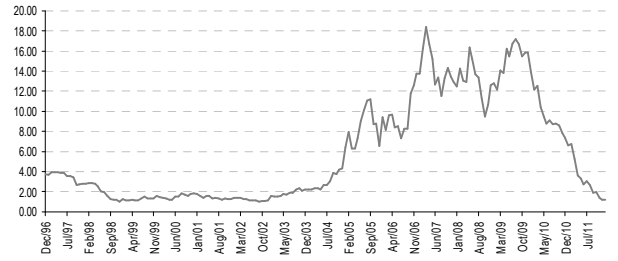
Energy Resources of Australia Ltd. (AUSTRALIA / Energy)

As Of: 06-Jan-2012

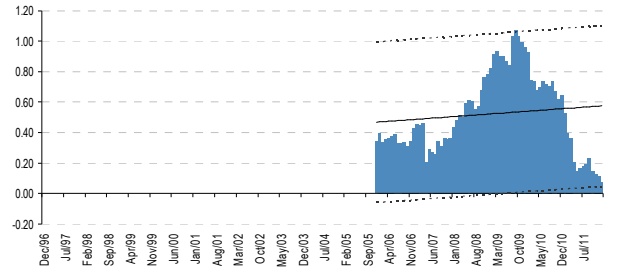
Global Equity Quantitative Analysis

Quant_Strategy@jpmorgan.com

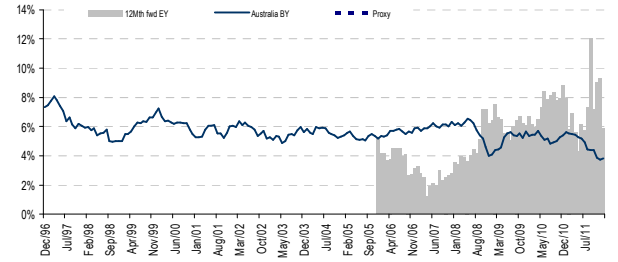
Local Share Price Current: 1.20



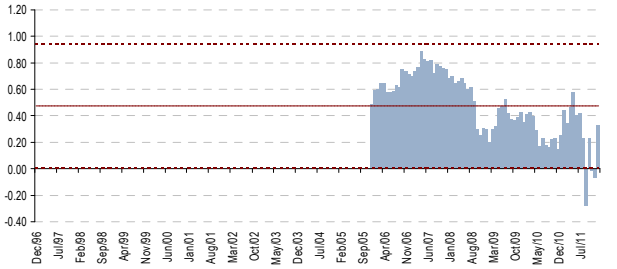
12 Mth Forward EPS Current: 0.07



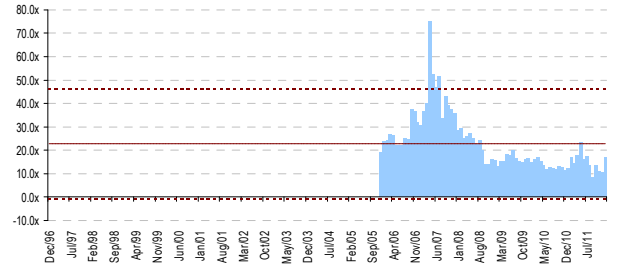
Earnings Yield (& local bond Yield) Current: 6%



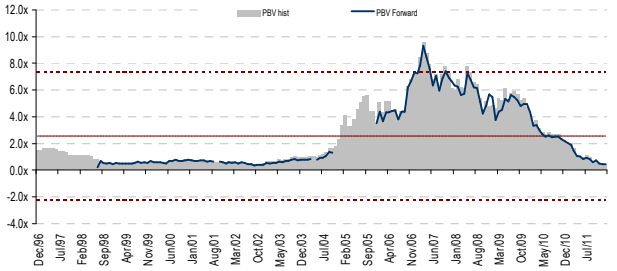
Implied Value Of Growth* Current: 33.10%



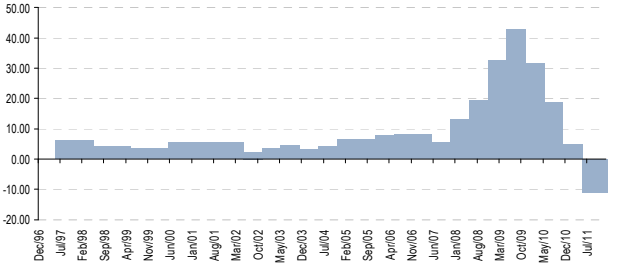
PE (1Yr Forward) Current: 17.0x



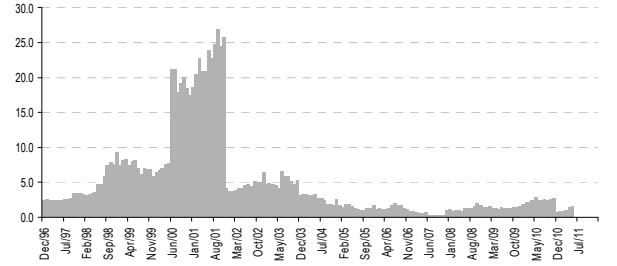
Price/Book Value Current: 0.4x



ROE (Trailing) Current: -11.00



Dividend Yield (Trailing) Current: 0.00



Summary

Energy Resources of Australia Ltd.								As Of:	6-Jan-12
AUSTRALIA	SEDOL	6317715						Local Price:	1.20
Energy								EPS:	0.07

	Latest	Min	Max	Median	Average	2 S.D.+	2 S.D. -	% to Min	% to Max	% to Med	% to Avg
12mth Forward PE	**16.99x**	8.31	75.00	17.99	22.81	46.46	-0.83	-51%	341%	6%	34%
P/BV (Trailing)	**0.42x**	0.40	9.60	1.14	2.58	7.37	-2.21	-4%	2212%	175%	522%
Dividend Yield (Trailing)	**0.00**	0.00	26.92	2.50	4.75	16.82	-7.32				
ROE (Trailing)	**-11.00**	-11.00	42.90	5.47	8.77	30.17	-12.63	0%	490%	150%	180%
Implied Value of Growth	**33.1%**	-0.28	0.89	0.47	0.48	0.95	0.00	-184%	168%	41%	44%

Source: Bloomberg, Reuters Global Fundamentals, IBES CONSENSUS, J.P. Morgan Calcs ** Implied Value Of Growth = (1 - EY/Cost of equity) where cost of equity =Bond Yield + 5.0% (ERP)*

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

J.P.Morgan

JPM Q-Profile

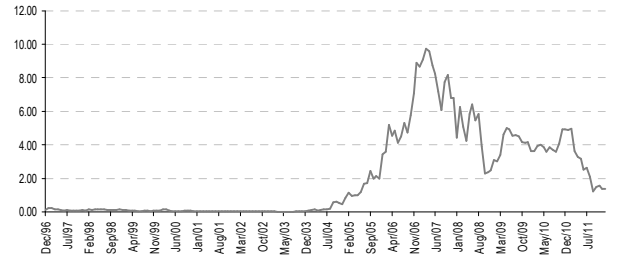
Paladin Energy Ltd. (AUSTRALIA / Energy)

As Of: 06-Jan-2012

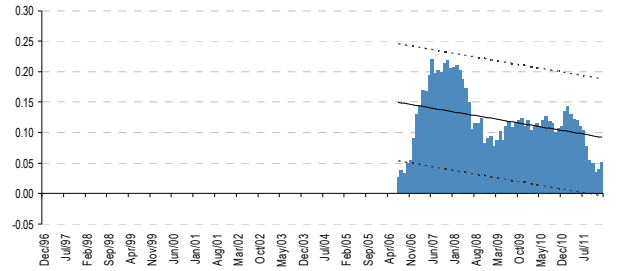
Global Equity Quantitative Analysis

Quant_Strategy@jpmorgan.com

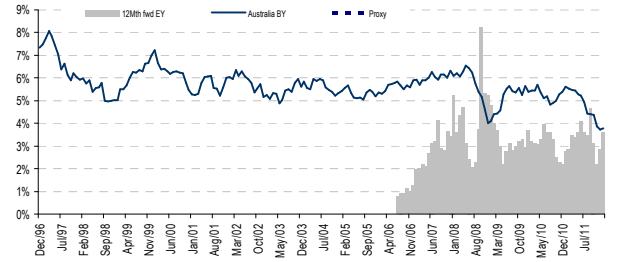
Local Share Price Current: 1.40



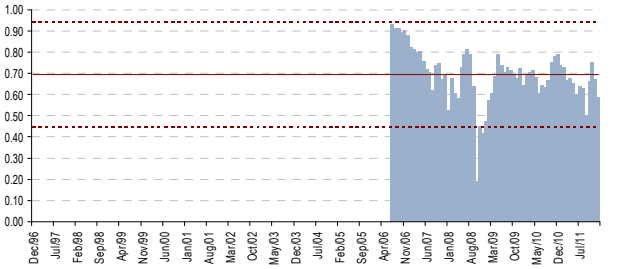
12 Mth Forward EPS Current: 0.05



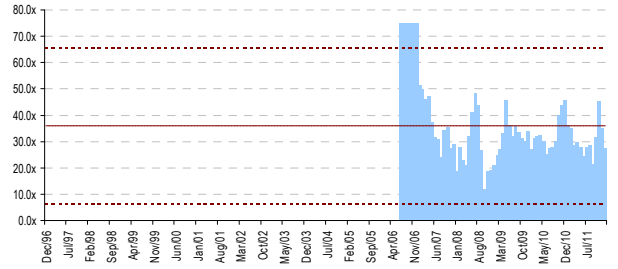
Earnings Yield (& local bond Yield) Current: 4%



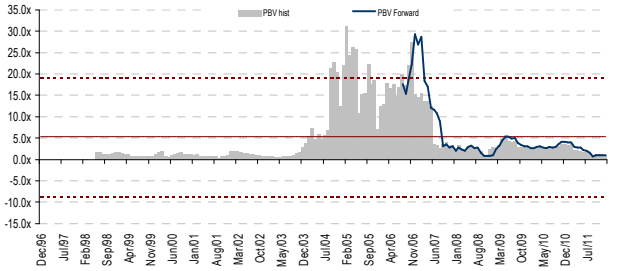
Implied Value Of Growth* Current: 58.99%



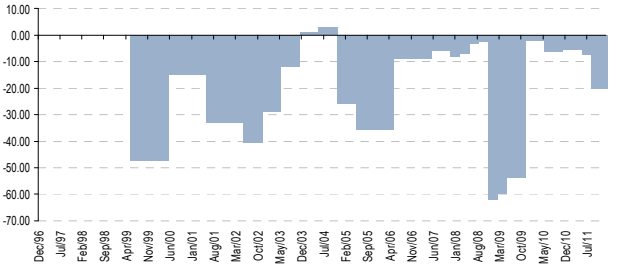
PE (1Yr Forward) Current: 27.7x



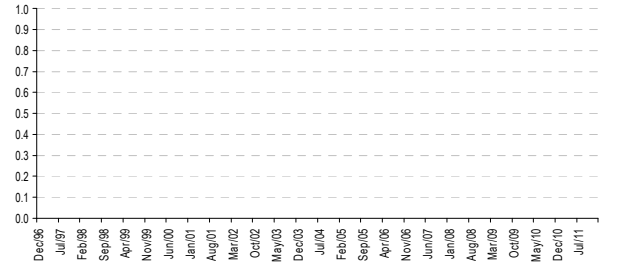
Price/Book Value Current: 1.0x



ROE (Trailing) Current: -19.97



Dividend Yield (Trailing) Current: 0.00



Summary

Paladin Energy Ltd.								As Of:	6-Jan-12
AUSTRALIA	SEDOL	6668468						Local Price:	1.40
Energy								EPS:	0.05

	Latest	Min	Max	Median	Average	2 S.D.+	2 S.D. -	% to Min	% to Max	% to Med	% to Avg
12mth Forward PE	**27.72x**	12.14	75.00	31.85	35.97	65.47	6.47	-56%	171%	15%	30%
P/BV (Trailing)	**1.04x**	0.45	31.25	2.30	5.27	19.18	-8.65	-56%	2912%	121%	408%
Dividend Yield (Trailing)	**0.00**	0.00	0.00	0.00	0.00	0.00	0.00				
ROE (Trailing)	**-19.97**	-62.06	2.84	-14.68	-21.65	14.84	-58.14	-211%	114%	26%	-8%
Implied Value of Growth	**59.0%**	0.19	0.93	0.70	0.69	0.94	0.45	-68%	57%	18%	18%

Source: Bloomberg, Reuters Global Fundamentals, IBES CONSENSUS, J.P. Morgan Calcs ** Implied Value Of Growth = (1 - EY/Cost of equity) where cost of equity =Bond Yield + 5.0% (ERP)*

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

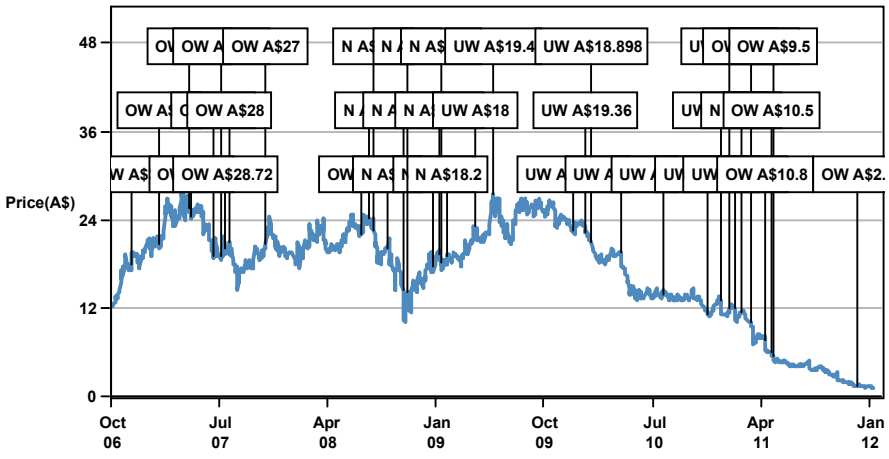
Analyst Certification: The research analyst(s) denoted by an "AC" on the cover of this report certifies (or, where multiple research analysts are primarily responsible for this report, the research analyst denoted by an "AC" on the cover or within the document individually certifies, with respect to each security or issuer that the research analyst covers in this research) that: (1) all of the views expressed in this report accurately reflect his or her personal views about any and all of the subject securities or issuers; and (2) no part of any of the research analyst's compensation was, is, or will be directly or indirectly related to the specific recommendations or views expressed by the research analyst(s) in this report.

Important Disclosures

- **Lead or Co-manager:** J.P. Morgan acted as lead or co-manager in a public offering of equity and/or debt securities for Energy Resources of Australia Limited within the past 12 months.
- **Client:** J.P. Morgan currently has, or had within the past 12 months, the following company(ies) as clients: Energy Resources of Australia Limited, Paladin Energy Ltd.
- **Client/Investment Banking:** J.P. Morgan currently has, or had within the past 12 months, the following company(ies) as investment banking clients: Energy Resources of Australia Limited, Paladin Energy Ltd.
- **Investment Banking (past 12 months):** J.P. Morgan received in the past 12 months compensation for investment banking Energy Resources of Australia Limited, Paladin Energy Ltd.
- **Investment Banking (next 3 months):** J.P. Morgan expects to receive, or intends to seek, compensation for investment banking services in the next three months from Energy Resources of Australia Limited, Paladin Energy Ltd.

Company-Specific Disclosures: Important disclosures, including price charts, are available for compendium reports and all J.P. Morgan–covered companies by visiting https://mm.jpmorgan.com/disclosures/company, calling 1-800-477-0406, or emailing research.disclosure.inquiries@jpmorgan.com with your request.

Energy Resources of Australia Limited (ERA.AX) Price Chart

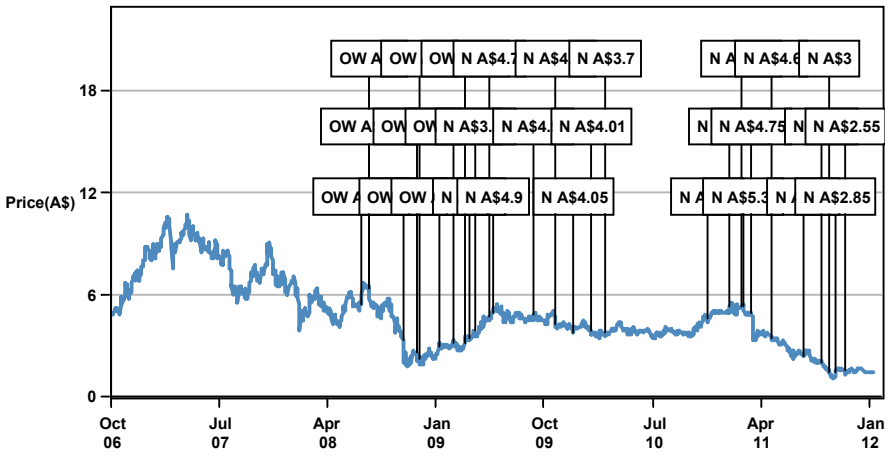


Source: Bloomberg and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Nov 21, 2006.

Date	Rating	Share Price (A$)	Price Target (A$)
21-Nov-06	OW	17.85	32.00
01-Feb-07	OW	20.79	31.00
16-Apr-07	OW	25.61	30.00
23-Apr-07	OW	24.59	32.00
18-Jun-07	OW	19.15	30.00
08-Jul-07	OW	19.00	28.60
17-Jul-07	OW	20.10	28.72
26-Jul-07	OW	20.92	28.00
26-Oct-07	OW	20.70	27.00
22-Jun-08	OW	22.02	24.00
15-Jul-08	N	24.15	23.00
25-Jul-08	N	22.65	21.20
29-Aug-08	N	20.18	22.00
07-Oct-08	N	14.36	21.80
21-Oct-08	N	14.04	18.00
23-Dec-08	N	17.80	18.10
09-Jan-09	N	19.30	19.13
14-Jan-09	N	18.28	19.40
30-Jan-09	N	19.00	18.20
07-Apr-09	UW	23.15	18.00
26-May-09	UW	27.53	19.40
14-Dec-09	UW	22.50	19.06
13-Jan-10	UW	22.27	19.36
29-Jan-10	UW	20.95	18.90
13-Apr-10	UW	19.69	17.92
30-Jul-10	UW	13.78	17.23
19-Nov-10	UW	11.26	12.25
21-Dec-10	UW	13.17	11.30
13-Jan-11	UW	11.98	11.50
28-Jan-11	UW	11.87	11.15

Mark Busuttil
(61-2) 9220-1553
mark.busuttil@jpmorgan.com

Paladin Energy Ltd (PDN.AX) Price Chart



Source: Bloomberg and J.P. Morgan; price data adjusted for stock splits and dividends.
Initiated coverage Jun 23, 2008.

Date	Rating	Share Price (A$)	Price Target (A$)
23-Jun-08	OW	5.43	7.15
16-Jul-08	OW	6.35	7.05
17-Jul-08	OW	6.35	7.00
07-Oct-08	OW	3.28	6.70
11-Nov-08	OW	2.60	6.60
19-Nov-08	OW	2.21	3.00
09-Jan-09	OW	2.96	3.45
13-Feb-09	OW	3.23	3.35
16-Mar-09	OW	3.14	3.60
26-Mar-09	N	3.43	3.60
07-Apr-09	N	3.84	3.55
13-May-09	N	4.76	4.70
26-May-09	N	4.95	4.90
01-Sep-09	N	4.85	4.93
29-Oct-09	N	4.28	4.16
14-Dec-09	N	3.80	4.05
27-Jan-10	N	3.88	4.01
03-Mar-10	N	3.74	3.70
19-Nov-10	N	4.57	5.20
13-Jan-11	N	5.35	5.35
10-Feb-11	N	5.34	5.65
15-Feb-11	N	5.35	5.35
08-Mar-11	N	5.00	4.75
28-Apr-11	N	3.45	4.60
20-Jul-11	N	2.37	3.50
02-Sep-11	N	2.03	3.20
22-Sep-11	N	1.42	3.00
06-Oct-11	N	1.36	2.85
31-Oct-11	N	1.50	2.55
10-Feb-11	N	11.40	11.60
08-Mar-11	OW	10.07	11.50
12-Apr-11	OW	7.72	10.80
28-Apr-11	OW	5.87	10.50
02-May-11	OW	5.33	9.50
30-Nov-11	OW	1.39	2.60

The chart(s) show J.P. Morgan's continuing coverage of the stocks; the current analysts may or may not have covered it over the entire period.
J.P. Morgan ratings: OW = Overweight, N= Neutral, UW = Underweight

Explanation of Equity Research Ratings and Analyst(s) Coverage Universe:
J.P. Morgan uses the following rating system: Overweight [Over the next six to twelve months, we expect this stock will outperform the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] Neutral [Over the next six to twelve months, we expect this stock will perform in line with the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] Underweight [Over the next six to twelve months, we expect this stock will underperform the average total return of the stocks in the analyst's (or the analyst's team's) coverage universe.] In our Asia (ex-Australia) and UK small- and mid-cap equity research, each stock's expected total return is compared to the expected total return of a benchmark country market index, not to those analysts' coverage universe. If it does not appear in the Important Disclosures section of this report, the certifying analyst's coverage universe can be found on J.P. Morgan's research website, www.morganmarkets.com.

Coverage Universe: Busuttil, Mark: Aquila Resources Ltd (AQA.AX), Atlas Iron Ltd (AGO.AX), Energy Resources of Australia Limited (ERA.AX), Fortescue Metals Group Ltd (FMG.AX), Gindalbie Metals Ltd (GBG.AX), Grange Resources (GRR.AX), Mount Gibson Iron Ltd (MGX.AX), Murchison Metals Ltd (MMX.AX), Paladin Energy Ltd (PDN.AX), Rio Tinto Limited (RIO.AX)

J.P. Morgan Equity Research Ratings Distribution, as of January 6, 2012

	Overweight (buy)	Neutral (hold)	Underweight (sell)
J.P. Morgan Global Equity Research Coverage	47%	42%	12%
IB clients*	52%	45%	36%
JPMS Equity Research Coverage	45%	47%	8%
IB clients*	72%	62%	58%

*Percentage of investment banking clients in each rating category.
For purposes only of FINRA/NYSE ratings distribution rules, our Overweight rating falls into a buy rating category; our Neutral rating falls into a hold rating category; and our Underweight rating falls into a sell rating category.

Equity Valuation and Risks: For valuation methodology and risks associated with covered companies or price targets for covered companies, please see the most recent company-specific research report at http://www.morganmarkets.com , contact the primary analyst or your J.P. Morgan representative, or email research.disclosure.inquiries@jpmorgan.com.

Equity Analysts' Compensation: The equity research analysts responsible for the preparation of this report receive compensation based upon various factors, including the quality and accuracy of research, client feedback, competitive factors, and overall firm revenues, which include revenues from, among other business units, Institutional Equities and Investment Banking.

Registration of non-US Analysts: Unless otherwise noted, the non-US analysts listed on the front of this report are employees of non-US affiliates of JPMS, are not registered/qualified as research analysts under NASD/NYSE rules, may not be associated persons of JPMS, and may not be subject to FINRA Rule 2711 and NYSE Rule 472 restrictions on communications with covered companies, public appearances, and trading securities held by a research analyst account.

Other Disclosures

J.P. Morgan ("JPM") is the global brand name for J.P. Morgan Securities LLC ("JPMS") and its affiliates worldwide. J.P. Morgan Cazenove is a marketing name for the U.K. investment banking businesses and EMEA cash equities and equity research businesses of JPMorgan Chase & Co. and its subsidiaries.

Options related research: If the information contained herein regards options related research, such information is available only to persons who have received the proper option risk disclosure documents. For a copy of the Option Clearing Corporation's Characteristics and Risks of Standardized Options, please contact your J.P. Morgan Representative or visit the OCC's website at http://www.optionsclearing.com/publications/risks/riskstoc.pdf

Legal Entities Disclosures
U.S.: JPMS is a member of NYSE, FINRA, SIPC and the NFA. JPMorgan Chase Bank, N.A. is a member of FDIC and is authorized and regulated in the UK by the Financial Services Authority. **U.K.:** J.P. Morgan Securities Ltd. (JPMSL) is a member of the London Stock Exchange and is authorized and regulated by the Financial Services Authority. Registered in England & Wales No. 2711006. Registered Office 125 London Wall, London EC2Y 5AJ. **South Africa:** J.P. Morgan Equities Limited is a member of the Johannesburg Securities Exchange and is regulated by the FSB. **Hong Kong:** J.P. Morgan Securities (Asia Pacific) Limited (CE number AAJ321) is regulated by the Hong Kong Monetary Authority and the Securities and Futures Commission in Hong Kong. **Korea:** J.P. Morgan Securities (Far East) Ltd, Seoul Branch, is regulated by the Korea Financial Supervisory Service. **Australia:** J.P. Morgan Australia Limited (ABN 52 002 888 011/AFS Licence No: 238188) is regulated by ASIC and J.P. Morgan Securities Australia Limited (ABN 61 003 245 234/AFS Licence No: 238066) is a Market Participant with the ASX and regulated by ASIC. **Taiwan:** J.P.Morgan Securities (Taiwan) Limited is a participant of the Taiwan Stock Exchange (company-type) and regulated by the Taiwan Securities and Futures Bureau. **India:** J.P. Morgan India Private Limited, having its registered office at J.P. Morgan Tower, Off. C.S.T. Road, Kalina, Santacruz East, Mumbai - 400098, is a member of the National Stock Exchange of India Limited (SEBI Registration Number - INB 230675231/INF 230675231/INE 230675231) and Bombay Stock Exchange Limited (SEBI Registration Number - INB 010675237/INF 010675237) and is regulated by Securities and Exchange Board of India. **Thailand:** JPMorgan Securities (Thailand) Limited is a member of the Stock Exchange of Thailand and is regulated by the Ministry of Finance and the Securities and Exchange Commission. **Indonesia:** PT J.P. Morgan Securities Indonesia is a member of the Indonesia Stock Exchange and is regulated by the BAPEPAM LK. **Philippines:** J.P. Morgan Securities Philippines Inc. is a member of the Philippine Stock Exchange and is regulated by the Securities and Exchange Commission. **Brazil:** Banco J.P. Morgan S.A. is regulated by the Comissao de Valores Mobiliarios (CVM) and by the Central Bank of Brazil. **Mexico:** J.P. Morgan Casa de Bolsa, S.A. de C.V., J.P. Morgan Grupo Financiero is a member of the Mexican Stock Exchange and authorized to act as a broker dealer by the National Banking and Securities Exchange Commission. **Singapore:** This material is issued and distributed in Singapore by J.P. Morgan Securities Singapore Private Limited (JPMSS) [MICA (P) 032/01/2012 and Co. Reg. No.: 199405335R] which is a member of the Singapore Exchange Securities Trading Limited and is regulated by the Monetary Authority of Singapore (MAS) and/or JPMorgan Chase Bank, N.A., Singapore branch (JPMCB Singapore) which is regulated by the MAS. **Malaysia:** This material is issued and distributed in Malaysia by JPMorgan Securities (Malaysia) Sdn Bhd (18146-X) which is a Participating Organization of Bursa Malaysia Berhad and a holder of Capital Markets Services License issued by the Securities Commission in Malaysia. **Pakistan:** J. P. Morgan Pakistan Broking (Pvt.) Ltd is a member of the Karachi Stock Exchange and regulated by the Securities and Exchange Commission of Pakistan. **Saudi Arabia:** J.P. Morgan Saudi Arabia Ltd. is authorized by the Capital Market Authority of the Kingdom of Saudi Arabia (CMA) to carry out dealing as an agent, arranging, advising and custody, with respect to securities business under licence number 35-07079 and its registered address is at 8th Floor, Al-Faisaliyah Tower, King Fahad Road, P.O. Box 51907, Riyadh 11553, Kingdom of Saudi Arabia. **Dubai:** JPMorgan Chase Bank, N.A., Dubai Branch is regulated by the Dubai Financial Services Authority (DFSA) and its registered address is Dubai International Financial Centre - Building 3, Level 7, PO Box 506551, Dubai, UAE.

Country and Region Specific Disclosures
U.K. and European Economic Area (EEA): Unless specified to the contrary, issued and approved for distribution in the U.K. and the EEA by JPMSL. Investment research issued by JPMSL has been prepared in accordance with JPMSL's policies for managing conflicts of interest arising as a result of

publication and distribution of investment research. Many European regulators require a firm to establish, implement and maintain such a policy. This report has been issued in the U.K. only to persons of a kind described in Article 19 (5), 38, 47 and 49 of the Financial Services and Markets Act 2000 (Financial Promotion) Order 2005 (all such persons being referred to as "relevant persons"). This document must not be acted on or relied on by persons who are not relevant persons. Any investment or investment activity to which this document relates is only available to relevant persons and will be engaged in only with relevant persons. In other EEA countries, the report has been issued to persons regarded as professional investors (or equivalent) in their home jurisdiction. **Australia:** This material is issued and distributed by JPMSAL in Australia to "wholesale clients" only. JPMSAL does not issue or distribute this material to "retail clients". The recipient of this material must not distribute it to any third party or outside Australia without the prior written consent of JPMSAL. For the purposes of this paragraph the terms "wholesale client" and "retail client" have the meanings given to them in section 761G of the Corporations Act 2001. **Germany:** This material is distributed in Germany by J.P. Morgan Securities Ltd., Frankfurt Branch and J.P.Morgan Chase Bank, N.A., Frankfurt Branch which are regulated by the Bundesanstalt für Finanzdienstleistungsaufsicht. **Hong Kong:** The 1% ownership disclosure as of the previous month end satisfies the requirements under Paragraph 16.5(a) of the Hong Kong Code of Conduct for Persons Licensed by or Registered with the Securities and Futures Commission. (For research published within the first ten days of the month, the disclosure may be based on the month end data from two months prior.) J.P. Morgan Broking (Hong Kong) Limited is the liquidity provider/market maker for derivative warrants, callable bull bear contracts and stock options listed on the Stock Exchange of Hong Kong Limited. An updated list can be found on HKEx website: http://www.hkex.com.hk. **Japan:** There is a risk that a loss may occur due to a change in the price of the shares in the case of share trading, and that a loss may occur due to the exchange rate in the case of foreign share trading. In the case of share trading, JPMorgan Securities Japan Co., Ltd., will be receiving a brokerage fee and consumption tax (shouhizei) calculated by multiplying the executed price by the commission rate which was individually agreed between JPMorgan Securities Japan Co., Ltd., and the customer in advance. Financial Instruments Firms: JPMorgan Securities Japan Co., Ltd., Kanto Local Finance Bureau (kinsho) No. 82 Participating Association / Japan Securities Dealers Association, The Financial Futures Association of Japan, Type II Financial Instruments Firms Association and Japan Securities Investment Advisers Association. **Korea:** This report may have been edited or contributed to from time to time by affiliates of J.P. Morgan Securities (Far East) Ltd, Seoul Branch. **Singapore:** JPMSS and/or its affiliates may have a holding in any of the securities discussed in this report; for securities where the holding is 1% or greater, the specific holding is disclosed in the Important Disclosures section above. **India:** For private circulation only, not for sale. **Pakistan:** For private circulation only, not for sale. **New Zealand:** This material is issued and distributed by JPMSAL in New Zealand only to persons whose principal business is the investment of money or who, in the course of and for the purposes of their business, habitually invest money. JPMSAL does not issue or distribute this material to members of "the public" as determined in accordance with section 3 of the Securities Act 1978. The recipient of this material must not distribute it to any third party or outside New Zealand without the prior written consent of JPMSAL. **Canada:** The information contained herein is not, and under no circumstances is to be construed as, a prospectus, an advertisement, a public offering, an offer to sell securities described herein, or solicitation of an offer to buy securities described herein, in Canada or any province or territory thereof. Any offer or sale of the securities described herein in Canada will be made only under an exemption from the requirements to file a prospectus with the relevant Canadian securities regulators and only by a dealer properly registered under applicable securities laws or, alternatively, pursuant to an exemption from the dealer registration requirement in the relevant province or territory of Canada in which such offer or sale is made. The information contained herein is under no circumstances to be construed as investment advice in any province or territory of Canada and is not tailored to the needs of the recipient. To the extent that the information contained herein references securities of an issuer incorporated, formed or created under the laws of Canada or a province or territory of Canada, any trades in such securities must be conducted through a dealer registered in Canada. No securities commission or similar regulatory authority in Canada has reviewed or in any way passed judgment upon these materials, the information contained herein or the merits of the securities described herein, and any representation to the contrary is an offence. **Dubai:** This report has been issued to persons regarded as professional clients as defined under the DFSA rules.

General: Additional information is available upon request. Information has been obtained from sources believed to be reliable but JPMorgan Chase & Co. or its affiliates and/or subsidiaries (collectively J.P. Morgan) do not warrant its completeness or accuracy except with respect to any disclosures relative to JPMS and/or its affiliates and the analyst's involvement with the issuer that is the subject of the research. All pricing is as of the close of market for the securities discussed, unless otherwise stated. Opinions and estimates constitute our judgment as of the date of this material and are subject to change without notice. Past performance is not indicative of future results. This material is not intended as an offer or solicitation for the purchase or sale of any financial instrument. The opinions and recommendations herein do not take into account individual client circumstances, objectives, or needs and are not intended as recommendations of particular securities, financial instruments or strategies to particular clients. The recipient of this report must make its own independent decisions regarding any securities or financial instruments mentioned herein. JPMS distributes in the U.S. research published by non-U.S. affiliates and accepts responsibility for its contents. Periodic updates may be provided on companies/industries based on company specific developments or announcements, market conditions or any other publicly available information. Clients should contact analysts and execute transactions through a J.P. Morgan subsidiary or affiliate in their home jurisdiction unless governing law permits otherwise.

"Other Disclosures" last revised January 6, 2012.