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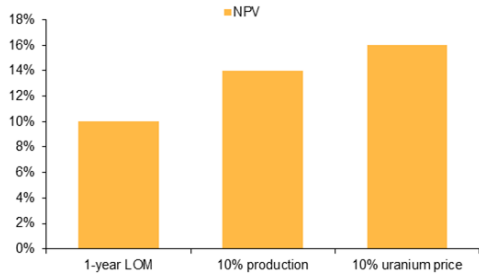
15 December 2021

Australia

EQUITIES

Sensitive to production and uranium prices



Source: BOE, Macquarie Research, December 2021

BOE AU	Outperform
Price (at 11:13, 14 Dec 2021 GMT)	A$2.21

Valuation - DCF (WACC 10.0%, beta 1.0, ERP 5.0%, RFR 2.4%, TGR 2.6%)	A$	3.02
12-month target	A$	3.00
12-month TSR	%	+35.7
Volatility Index		Very High
GICS sector		Energy
Market cap	A$m	631
30-day avg turnover	A$m	21.5
Number shares on issue	m	285.5

Investment fundamentals

Year end 30 Jun		2021A	2022E	2023E	2024E
Revenue	m	0.0	0.0	20.8	108.2
EBITDA	m	-3.8	-4.3	4.4	64.6
EBIT	m	-3.8	-4.3	0.3	52.1
Reported profit	m	0.8	-4.0	0.0	36.8
Adjusted profit	m	0.8	-4.0	0.0	36.8
Gross cashflow	m	0.8	-4.0	4.2	49.2
CFPS	¢	1.0	-1.3	1.3	14.7
CFPS growth	%	nmf	nmf	nmf	1,071
PGCFPS	x	226.7	nmf	176.1	15.0
EPS adj	¢	1.0	-1.3	0.0	11.0
EPS adj growth	%	nmf	nmf	nmf	197,810.9
PER adj	x	226.7	nmf	39,843.2	20.1
Total DPS	¢	0.0	0.0	0.0	0.0
Total div yield	%	0.0	0.0	0.0	0.0
ROA	%	-4.0	-3.0	0.1	22.5
ROE	%	0.9	-4.7	0.0	36.8
EV/EBITDA	x	-15.4	-166.8	161.8	11.1
Net debt/equity	%	-24.4	-95.4	-33.7	-37.5

Source: FactSet, Macquarie Research, December 2021
(all figures in AUD unless noted)

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Boss Energy (BOE AU)
Booking the Honeymoon

Key points

- We initiate coverage of BOE with an Outperform rating and an A$3.00/share target price as it looks to develop and restart the Honeymoon project.
- The Honeymoon uranium project is fully licensed, in a tier-one jurisdiction and has a near-term path to market buoyed by rallying uranium prices.
- Our outlook (11-year mine life and production of ~2.45mlb per annum at a cash cost of US$18.40/lb) is based on BOE's enhanced feasibility study.

A near-term uranium producer

BOE owns 100% of the Honeymoon uranium restart project in South Australia, which has a near-term clear path to production. The Honeymoon project is located in a tier-1 justification; is fully licensed for exports of up to 3.3mlb and is run by a strong management team which has leveraged off industry experts.

Our forecasts align closely with the enhanced feasibility study (EFS), with our base case assuming an FID in early CY22 and first production in FY23 followed by a 24-month ramp-up to 2.45mlb steady state production.

Our base case assumes a 11-year life of mine, producing 22.0mlb at cash costs of US$18.30/lb over the LOM following restart and ramp-up capex of A$107m. Our forecasts estimate LOM revenue and Ebitda of A$1,877m and A$1,166m respectively which drives the Ebitda margin of 62%. The key risks to our outlook is commodity prices and FX rates and variances in restart decision date and the ramp up versus our base case assumptions.

Exploration and resource conversion upside

The current mining inventory at the Honeymoon restart area of 24.1mt at ~667ppm U_3O_8 for 36.0mlb of contained U_3O_8 only accounts for half of the published mineral resource. Conversion of resources into minable inventory and further resource growth via exploration over the large ~2,600km^2 tenements, drives upside to both our annual production estimates of 2.45mlb and the life of mine of 11 years.

Additionally, the scalability of the NIMCIX modules, which will be used for the Ion Exchange processing, and the export capacity of 3.3mlb provides a pathway to growth beyond the production profile highlighted in the EFS.

Contracting begets contracting

Spot and contract uranium prices have languished over the last decade, however recent catalysts including global electrification and decarbonisation; supply discipline and fund physical buying in the spot market have resulted in a rally in uranium prices and a market refocus onto uranium. Given the low level of utility contracting currently, we believe that a price rally would induce contracting for surety of supply which would result in a frenzy of contracting driving up uranium prices in the near to medium term. In the longer-term we expect price support as new supply requires incentive pricing above US$55/lb.

Our uranium forecasts assume a further rally in spot and contract pricing beyond US$60/lb, which we believe is around the point BOE will look to contract a portion (50% in our base base) of its future uranium production and take a Final Investment Decision (FID) on the Honeymoon project.

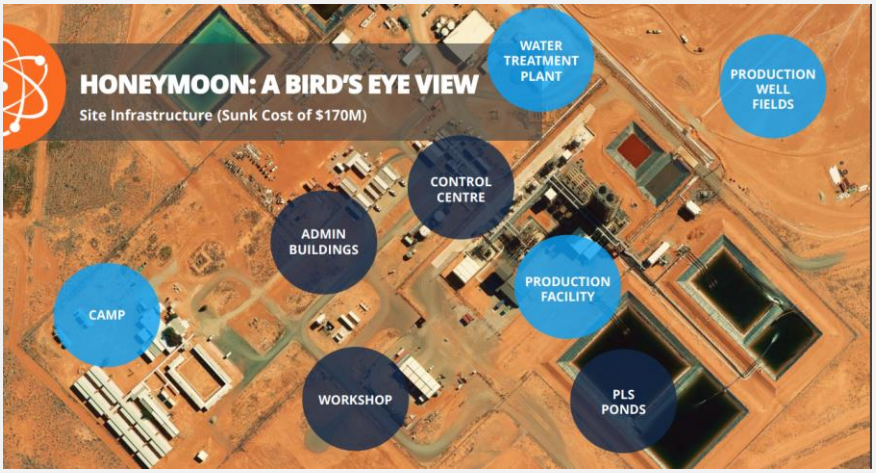
Inside

Boss Energy (BOE AU)

Company profile

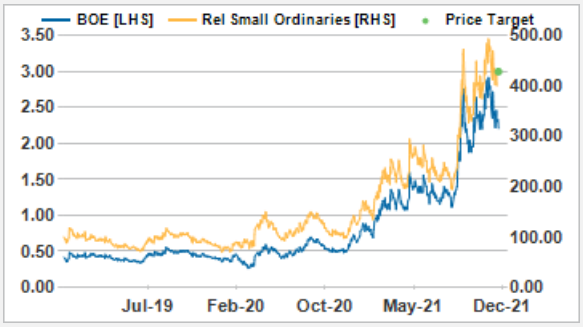
- Boss Energy (BOE ASX) owns the Honeymoon uranium project, a re-start operation, in South Australia. The Honeymoon project is fully licenced for exports of up to 3.3mlb per annum, with first production to occur ~12 months after FID.
- The recent Enhanced Feasibility Study (EFS) highlighted an 11-year Life of Mine with peak production of 2.45mlb of U_3O_8 at AISC of US$25.62/lb and start-up costs of ~US$80m. The EFS was based on only 36Mlbs of the total JORC that Resource of 71.6Mlbs.
- Honeymoon will utilise the In-situ Recovery method of mining (a method which is used to produce ~60% of global uranium annually) and the processing will be re-developed using Ion Exchange (IX) via the NIMCIX columns in place of the existing SX processing facility.

Fig 1 Overview of BOE's Honeymoon operations



Source: BOE, December 2021

Fig 2 BOE AU rel Small Ordinaries performance, & rec history

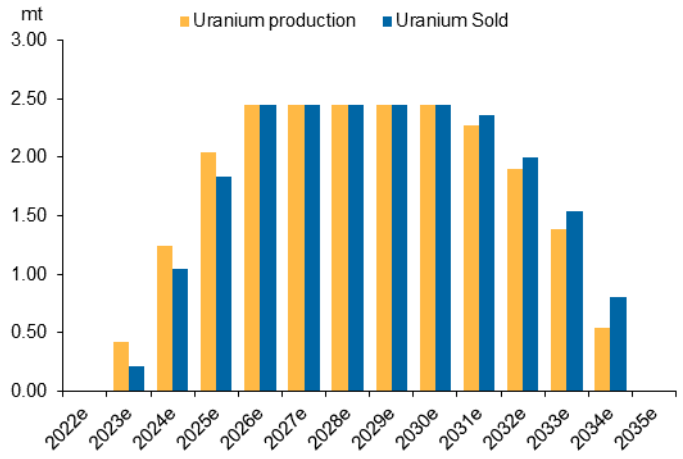


Note: Recommendation timeline - if not a continuous line, then there was no Macquarie coverage at the time or there was an embargo period.

Source: FactSet, Macquarie Research, December 2021

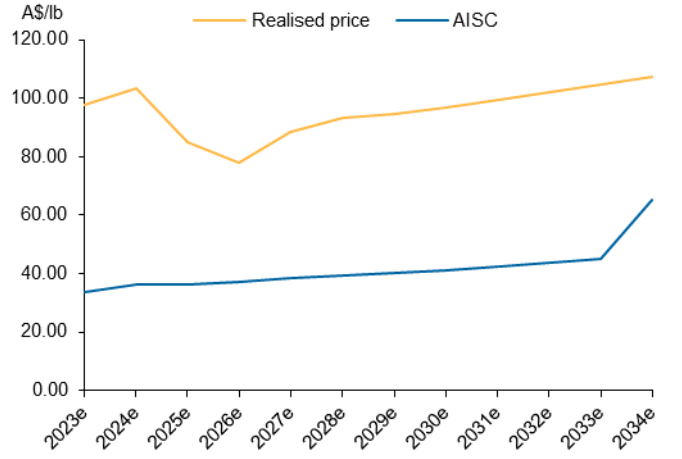
(all figures in AUD unless noted)

Fig 3 Honeymoon Uranium production and sales



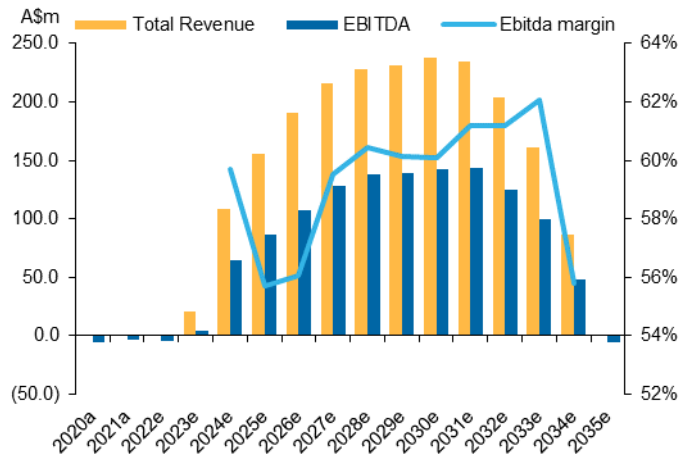
Source: BOE, Macquarie Research, December 2021

Fig 4 Honeymoon realised prices and AISC



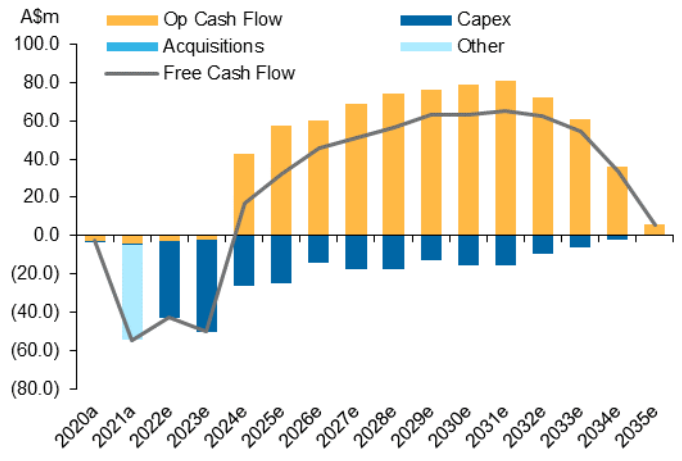
Source: BOE, Macquarie Research, December 2021

Fig 5 BOE revenue and Ebitda



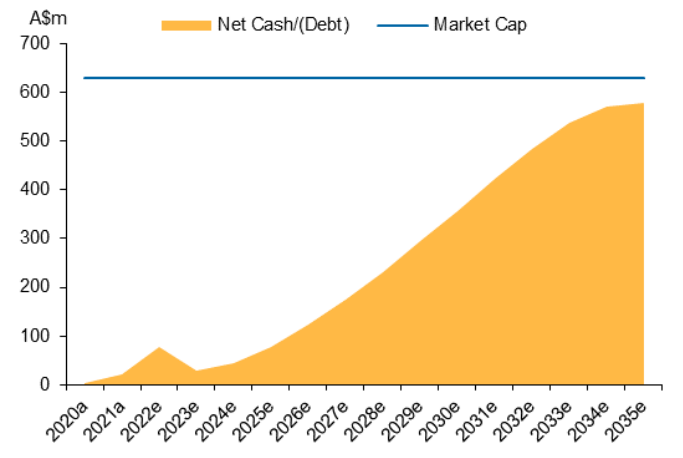
Source: BOE, Macquarie Research, December 2021

Fig 6 BOE cashflow



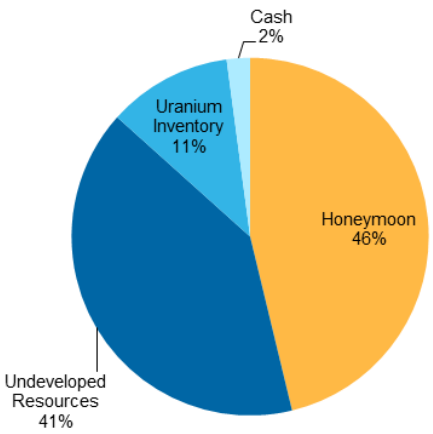
Source: BOE, Macquarie Research, December 2021

Fig 7 BOE net cash position



Source: BOE, Macquarie Research, December 2021

Fig 8 BOE valuation breakdown



Source: Macquarie Research, December 2021

Fig 9 Boss Energy summary forecasts and valuation

Boss Energy

ASX: BOE	**Price: (A$ps)**	A$2.21	**Year end:**	June	**Rating:**	**Outperform**	**Up/dn** **TSR**
	Mkt cap: (A$m)	629	**Diluted shares (m)**	335	**Target:**	**A$3.00**	**36%** **36%**
	Mkt cap: (US$m)	460					

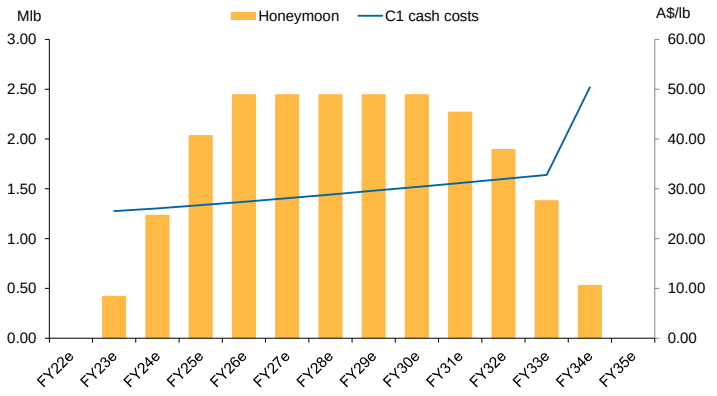
RATIO ANALYSIS		FY21	FY22e	FY23e	FY24e	FY25e	FY26e
Diluted share capital	m	284.8	334.8	334.8	334.8	334.8	334.8
EPS (diluted and pre sig. items)	A¢	(0.1)	(1.3)	0.0	11.0	13.9	17.2
P/E	**x**	**(4,390x)**	**(170.0x)**	**39,843x**	**20.1x**	**15.9x**	**12.8x**
CFPS	A¢	(1.1)	(1.1)	(0.6)	12.8	17.1	17.9
P/CF	x	(194.4x)	(205x)	(344.7x)	17.3x	12.9x	12.4x
DPS	A¢	0.0	0.0	0.0	0.0	0.0	0.0
Dividend yield	**%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**
Franking Level	%	0%	0%	0%	0%	0%	0%
Book value per share	x	0.3	0.2	0.2	0.4	0.5	0.7
P/Book value	x	7.4x	9.1x	9.1x	6.3x	4.5x	3.3x
R.O.E. (pre sig items)	%	(9.7%)	(5.7%)	(1.2%)	30.5%	27.5%	25.1%
R.O.A. (pre sig items)	%	(4.0%)	(2.2%)	0.1%	20.3%	21.8%	24.5%
Interest Cover	x	(0.8x)	(12.3x)	0.5x	147.3x	117.0x	86.3x
EBITDA per share	A$ps	-0.01	-0.01	0.01	0.19	0.26	0.32
EV/EBITDA	**x**	**(162.0x)**	**(153.6x)**	**160.3x**	**10.8x**	**7.6x**	**5.8x**
Free cash flow yield	%	7%	(6%)	(7%)	2%	4%	6%

COMMODITY PRICES	FY21	FY22e	FY23e	FY24e	FY25e	FY26e
A$/US$	0.75	0.73	0.74	0.71	0.71	0.70
Uranium (US$/lb U3O8)	31.6	43.0	72.5	85.0	55.0	42.5
Uranium (A$/lb U3O8)	42.2	58.8	98.6	119.3	78.0	60.7

PRODUCTION		FY21	FY22e	FY23e	FY24e	FY25e	FY26e
Uranium Production							
Honeymoon	(Mlb)	0.00	0.00	0.43	1.24	2.04	2.45
Uranium Sold							
Honeymoon	(Mlb)	0.00	0.00	0.21	1.05	1.84	2.45
Costs							
C1 cash costs	(US$/lb)			18.75	18.57	18.85	19.18
C1 cash costs	(A$/lb)			25.51	26.07	26.73	27.40
AISC	(US$/lb)			24.54	25.83	25.52	25.93
AISC	(A$/lb)			33.39	36.26	36.21	37.04

EARNINGS		FY21	FY22e	FY23e	FY24e	FY25e	FY26e
Sales Revenue	A$m	0	0	21	108	156	191
Other Revenue	A$m	(0)	0	0	0	0	0
Total Revenue	**A$m**	**(0)**	**0**	**21**	**108**	**156**	**191**
Operating Costs	A$m	0	0	(12)	(39)	(65)	(80)
Operational EBITDA	**A$m**	**(0)**	**0**	**9**	**69**	**91**	**112**
Exploration	A$m	(1)	(0)	0	0	0	0
Corporate & Other Costs	A$m	(3)	(4)	(4)	(4)	(4)	(4)
EBITDA	**A$m**	**(4)**	**(4)**	**4**	**65**	**87**	**107**
D&A	A$m	0	0	(4)	(12)	(21)	(26)
EBIT	**A$m**	**(4)**	**(4)**	**0**	**52**	**66**	**81**
Net Interest	A$m	(5)	(0)	(0)	(0)	(1)	(1)
Profit Before Tax	**A$m**	**(8)**	**(5)**	**(0)**	**52**	**65**	**80**
Tax Expense	A$m	0	0	(1)	(16)	(20)	(25)
Adjusted NPAT	**A$m**	**(8)**	**(5)**	**(1)**	**36**	**45**	**56**
Minorities	A$m						
Significant Items (post tax)	A$m	0	0	0	0	0	0
Reported NPAT	**A$m**	**(8)**	**(5)**	**(1)**	**36**	**45**	**56**

URANIUM PRODUCTION (Mlb)



CASHFLOW		FY21	FY22e	FY23e	FY24e	FY25e	FY26e
Net Profit	**A$m**	**(4)**	**(4)**	**0**	**37**	**46**	**58**
Interest/Tax/D&A	A$m	0	1	5	13	14	1
Working Capital/other	**A$m**	0	(0)	(7)	(7)	(3)	1
Net Operating Cashflow	**A$m**	**(3)**	**(4)**	**(2)**	**43**	**57**	**60**
Capex	A$m	(2)	(41)	(48)	(26)	(25)	(14)
Investments	A$m	50	(1)	0	0	0	0
Sale of PPE and Other	A$m	0	0	0	0	0	0
Free cash flow	**A$m**	**45**	**(45)**	**(50)**	**17**	**32**	**46**
Dividends Paid	A$m	0	0	0	0	0	0
Debt	A$m	0	0	0	0	0	0
Equity Issuance	A$m	72	100	0	0	0	0
Other	A$m						
Net Financing Cashflow	**A$m**	**72**	**100**	**0**	**0**	**0**	**0**
Net change in cash	**A$m**	**117**	**55**	**(50)**	**17**	**32**	**46**

RESERVES AND RESOURCES

Reserves		Grade	Contained Metal	
Honeymoon	mt	ppm U3O8	(kt, U3O8)	(Mlb, U3O8)
TOTAL	**0**		**0**	**0**

Resources		Grade	Contained Metal	
Honeymoon	mt	ppm U3O8	(kt, U3O8)	(Mlb, U3O8)
Measured	3.1	1,100	3.41	7.52
Indicated	18.4	630	11.31	24.93
Inferred	30.9	570	17.75	39.13
TOTAL	**52.4**	**623**	**32.66**	**71.99**

BALANCE SHEET		FY21	FY22e	FY23e	FY24e	FY25e	FY26e
Cash	A$m	21	78	28	44	77	123
PP&E & Mine Development	A$m	63	104	148	161	165	153
Exploration	A$m	11	11	11	11	11	11
Total Assets	**A$m**	**95**	**193**	**206**	**256**	**302**	**332**
Debt	A$m	0	0	0	0	0	0
Total Liabilities	**A$m**	**9**	**111**	**125**	**138**	**137**	**110**
Total Net Assets / Equity	**A$m**	**85**	**81**	**82**	**118**	**165**	**222**
Net Debt / (Cash)	A$m	(21)	(78)	(28)	(44)	(77)	(123)
Gearing (net debt/(nd + equity))	%	(32%)	nm	(51%)	(60%)	(87%)	(123%)
Gearing (net debt/equity)	%	(24%)	(95%)	(34%)	(37%)	(47%)	(55%)

SUM-OF-THE-PARTS NPV	Spot prices		Macquarie forecasts	
Projects	**A$m**	**A$ps**	**A$m**	**A$ps**
Honeymoon	314	0.94	440	1.31
Undeveloped Resources	385	1.15	385	1.15
Uranium Inventory	107	0.32	107	0.32
Unpaid capital	100	0.30	100	0.30
Corporate	(40)	(0.12)	(40)	(0.12)
Cash	20	0.06	20	0.06
Debt	0	0.00	0	0.00
Net Equity Value (@ 10% WACC)	**886**	**2.65**	**1,012**	**3.02**
Target price (1.0x NAV)				**3.00**

Source: BOE, Macquarie Research, December 2021

Uranium thematic a tailwind for Honeymoon

We initiate with an Outperform rating and A$3.00 price target

We initiate with an Outperform rating and A$3.00 price target

We initiate coverage of BOE with an Outperform recommendation and a A$3.00/sh price target. BOE owns 100% of the fully licenced Honeymoon uranium project in South Australia, which is development and re-start ready. An increase in uranium contract pricing remains the key hurdle to an FID, where after production and sales could occur ~12 months later.

We believe BOE represents a low-risk development opportunity providing leverage to the current uranium uptrend, with additional global focus shifting to decarbonisation and energy security. Key investment highlights include: **1)** full licensing up to 3.3mlb; **2)** a short path to production from FID of ~12 months; **3)** a tier-1 jurisdiction of Australia; **4)** resource upside, with only ~50% of the JORC resource currently in the mine plan, and **5)** a strong management and consultancy team.

Valuation based on sum-of-the-parts

Our forecasts are largely in line with the EFS

The recent Enhanced Feasibility Study (EFS) highlighted a 11-year mine life at Honeymoon, producing 21.81mlb of U_3O_8 at a AISC of US$25.62/lb and capital expenditure of A$107m or US$80m. We note BOE used a LOM average uranium price of US$60/lb and an exchange rate of 0.75 US$/A$.

Our forecasts are largely in line with the EFS, with key variances being our revenue and Ebitda LOM forecasts of A$1,877m and A$1,166m respectively being 10% ahead of the EFS due to variances in uranium and FX over the LOM. Our FCF over the LOM is 4% higher than the EFS as we forecast higher sustaining capital expenditure and have included a closure cost at the end of the current forecast lift of mine.

Fig 10 Our forecasts are largely in line with BOE's recent enhanced feasibility study

EFS versus Macq		2021 EFS	Macq	Variance
Life of Mine	*Years*	11	11	0%
Uranium production	*Mlb*	21.81	22.05	1%
LOM Revenue	*A$m*	1,705	1,877	10%
LOM Ebitda	*A$m*	1,058	1,166	10%
Ebitda Margin	*%*	62%	62%	0%
LOM FCF	*A$m*	567	591	4%
Cash Cost	*US$/lb U_3O_8*	18.46	18.26	(1%)
AISC	*US$/lb U_3O_8*	25.62	26.25	2%
Capex	*A$m*	107	107	(0%)
NPV	*A$m*	412	440	7%
IRR	*%*	47%	48%	3%

Source: BOE, Macquarie Research, December 2021

45% of our valuation related to the Honeymoon restart,

Our A$3.00/sh prices target for BOE is derived off a 1.0x NPV. Our NPV is a sum-of-the-parts incorporating discounted cash flow valuations for BOE's operating assets (Honeymoon), a value for the undeveloped resources and the current uranium inventory holding.

33% to the undeveloped resources

We also capture corporate overhead costs of A$40m and current net cash of A$20m. We have assumed a A$100m capital raising to fund the Honeymoon restart, noting our valuation is on a post-raising fully dilutive basis. We note that our WACC of 10% captures the risk of development, but also rewards BOE for being fully licensed and operating in a tier-1 jurisdiction.

Fig 11 We initiate with an Outperform rating and A$3.00 price target

SUM-OF-THE-PARTS NPV	Macquarie forecasts
Projects	**A$m**	**A$ps**
Honeymoon	440	1.31
Undeveloped Resources	385	1.15
Uranium Inventory	107	0.32
Unpaid capital	100	0.30
Corporate	(40)	(0.12)
Cash	20	0.06
Debt	0	0.00
Net Equity Value (@ 10% WACC)	**1,012**	**3.02**
Target price (1.0x NAV)		**3.00**

Source: BOE, Macquarie Research, December 2021

Upside to our base case on funding assumptions

We assume a A$100m equity raising to fund the restart

Our valuation assumes BOE retains a 100% equity interest in the Honeymoon operation and given the current net cash position of ~A$20m and the restart capital requirement of A$107m; we have assumed an equity raising of A$100m in 1H CY22 at a A$2.00/sh price.

Risks to our funding assumptions includes alternative funding solutions including the use of debt or BOE being able to factor or monetise its physical uranium inventory. We note that both these options provide upside risk to our valuation given the reduction in dilution. Additionally, variances in the raising price versus our A$2.00/sh assumptions, which is at a 10% discount to the current share price, would also impact dilution.

Fig 12 We have forecast a A$100m equity raising at A$2.00/sh

Equity dilution assumptions	A$m	Price	Shares (m)
Equity raining in 1HCY22	100.00	2.00	50.00
Total fully dilutive shares			334.79

Source: Macquarie Research, December 2021

Highly sensitive to uranium prices and the Australian dollar

10% change to uranium and FX prices drives 18% and 10% changes to earnings respectively

Our earnings and valuation for BOE are sensitive to our commodity price assumptions. A 10% change in our uranium price forecasts has a significant impact on our LOM earnings forecasts with earnings increasing by 24% in the ramp-up and 18% on average over the 11-year LOM. A 10% change in uranium prices would drive a 16% change in our valuation. As BOE's costs are largely in AUD and it reports in AUD, movements in the A$/US$ exchange rate also have a significant impact on our earnings forecasts and valuation for BOE of 8-10%.

Fig 13 Earnings and valuation leverage to a 10% move in commodity prices

Y/E June	FY24e	FY25e	FY26e	FY27e	FY28e	FY29e	FY30e	FY31e	FY32e	NPV
10% change in uranium price	24%	20%	18%	18%	18%	18%	18%	18%	18%	16%
10% change in A$/US$	13%	11%	10%	10%	10%	10%	10%	10%	10%	8%

Source: Macquarie Research, December 2021

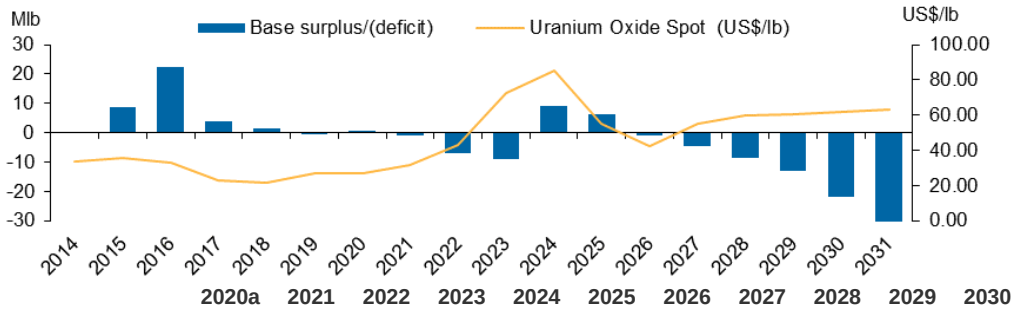
We are positive on the outlook for Uranium

We expect a rally in uranium over the next 2 years to incentivise restarts and new supply

We are positve on the outlook for uranium prices driven by: **1)** forecast demand exceeding mine supply over the longer-term; **2)** an increase in utilites contracting levels; **3)** price discovery been driven by physical purchases from non-consuming market entities, and **4)** global decarbonidation and increased electricifation, with uranium returning to the energy mix globally.

We envision a price increase to ~US$80/lb over CY22-24 driven by the above factors, prior to latent capacity and new supply coming online resulting in a "normalisition" of uranium prices. In the longer-term (CY26 onward), we believe uranium prices would need to be above US$60/lb to incentivise new supply. See "***Uranium Market***" section for further detail.

Fig 14 Uranium price forecasts and supply demand



		2020a	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Uranium Oxide	US$/lb	26.9	31.6	43.0	72.5	85.0	55.0	42.5	55.0	60.0	60.3	61.7

Source: Bloomberg, Company data, Macquarie Research, December 2021

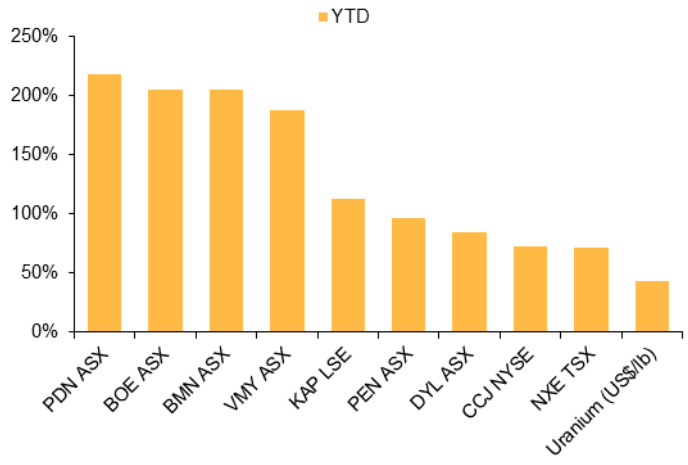
ASX uranium plays have performed strongly in 2021

Selected ASX uranium plays (BOE, PDN, VMY and BMN) are up ~200% YTD

ASX uranium producers have performed strongly in 2021, with PDN up 220%; BOE and BMN up 205% and VMY up 118%. We note that over the same period uranium spot prices have increased 44% after a long period of being depressed, due to funds physical buying in the spot market and an increased interest in levels of utilities contracting. We note that the major international producers share price have also increased strongly in 2021, with Kazatomprom up 115%, Cameco up 73% and NexGen Energy up 71%.

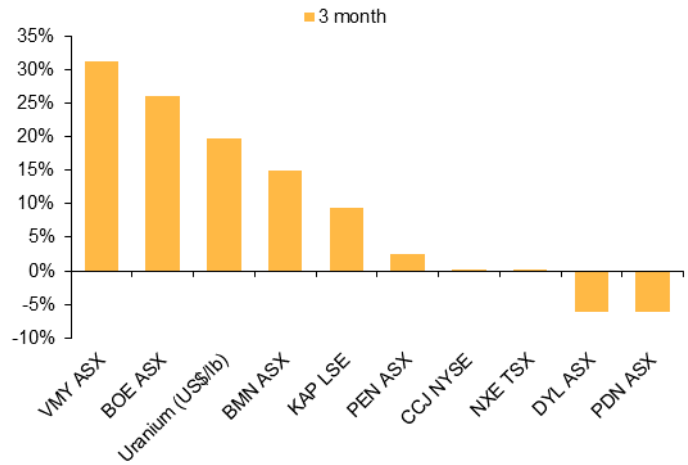
Interestingly, while much of the uranium spot price increase occurred in the last 3 months, the equities began rallying prior to the increase in uranium prices. We believe this is due to the equities market increasing focus on electronification and global decarbonisation.

Fig 15 Equity and uranium performance (YTD)



Source: FactSet, Macquarie Research, December 2021

Fig 16 Equity and uranium performance (3 months)



Source: FactSet, Macquarie Research, December 2021

BOE is re-rating toward producer multiples

We outline BOE versus its global listed peer group below, noting the BOE has a line of sight towards producer status which appears to attract a healthy premium on a market capitalisation to resource basis. BOE currently trades at a resource multiple premia to ASX peers, however much it trades below the major international producers of Cameco and Kazatomprom.

Fig 17 BOE versus ASX and globally listed uranium peers

	Ticker	Share price (local currency)	Market Cap (A$m)	Resources (mlb)	MC/lb resources
Boss Energy	BOE ASX	2.22	634	72	8.8
Paladin Energy	PDN ASX	0.77	2,063	356	5.8
Vimy Resources	VMY ASX	0.21	220	91	2.4
Deep Yellow	DYL ASX	0.85	324	196	1.7
Bannerman Energy	BMN ASX	0.27	333	208	1.6
Peninsula Energy	PEN ASX	0.21	209	54	3.9
Cameco Corp	CCJ NYSE	28.22	12,460	1,241	10.0
Kazatomprom	KAP LSE	39.24	14,445	1,231	11.7
NexGen Energy	NXE TSX	5.67	2,376	337	7.0

Source: Company data, FactSet, Macquarie Research, December 2021

Risks:

- Key risks to our investment thesis includes: **1)** Commodity price and exchange rate fluctuations versus our base case forecasts; **2)** Capex and operating cost variations versus our forecasts; **3)** variations in timing of the FID, start-up and ramp-up of Honeymoon; **4)** Resource conversion and mine life extension form a material part of our resource valuation (~33%% of NPV); **5)** funding risks versus our base case assumptions; and **6)** regulatory and environmental risks surrounding Honeymoon and the Uranium market in general.

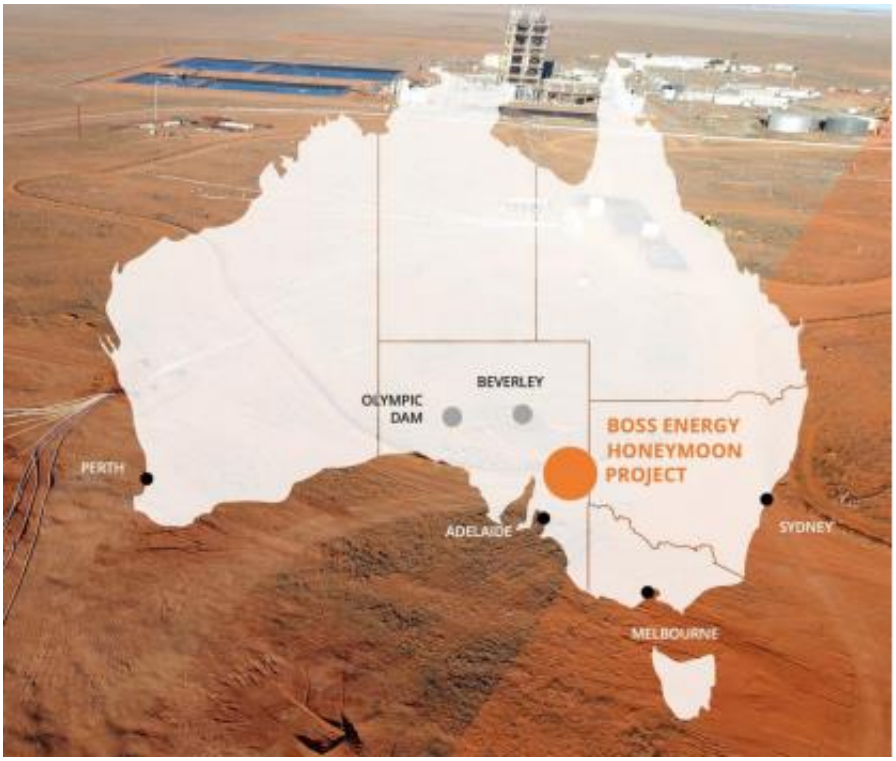
Honeymoon has a path to near-term production

Fully licensed near term uranium producer in tier-1 jurisdiction

BOE owns 100% of the Honeymoon uranium project

BOE owns 100% of the Honeymoon uranium project, located in South Australia. The asset produced in 2011 before being placed into care and maintenance in early 2014 due to depressed uranium pricing conditions. The Project consists of two main exploration areas (the Eastern and Western tenement regions) with one granted Mining Lease 6109 (ML6109), totalling a 2,595km2 tenement package.

Fig 18 Project location in South Australia



Source: BOE, December 2021

FID on restart expected in 2022

BOE is looking to restart the project, awaiting uranium price support (estimated at ~US$60/lb contract pricing) which would be the trigger for FID. The operations will utilise an in-situ recovery (ISR) method of mining and has plans to incorporate NIMCIX technology for processing.

Fig 19 Timeline of key milestones at Honeymoon

Milestone	Date	Status
Acquisition of Honeymoon Uranium Project - global **Resources of 16.6Mlb U_3O_8**	Dec 2015	✓
Scoping study confirming **low capital requirements and operating costs for Honeymoon re-start**	Sept 2016	✓
PFS - 2Mlb p.a. U_3O_8 production, significant potential for economic upside with further resource expansion and/or LOM extension	May 2017	✓
Field Leach Trial - improved leach chemistry results in historic high tenors (>80mg/L U_3O_8) exceeded plant design. **Ion Exchange process successfully proved** with excellent performance of selected resins on Honeymoon conditions	Nov 2017	✓
Boss acquired the remaining 20% of Honeymoon project - **100% ownership**	Mar 2018	✓
Mineral Resource upgrade - global **Resources of 71.6 Mlb U_3O_8**, increasing Honeymoon's re-start area to 36Mlb contained U_3O_8	Feb 2019	✓
Australian Government renews Honeymoon's **Export Permit for 3.3Mlb p.a. U_3O_8**, planned operations fully permitted	Apr 2019	✓
Feasibility Study confirming Honeymoon as Australia's next Uranium Producer with global first mover advantage. 12-month timeframe from Final Investment Decision to production	Jan 2020	✓
$15M Capital Raising at $0.067/sh - to fund ongoing technical process optimisation studies and exploration activities	Oct 2020	✓
Comprehensive geological review of historic database while site activities were restricted due to COVID-19	2020 - 2021	✓
$60M Capital Raising at $0.14/sh - acquisition of 1.25Mlb U_3O_8 strategic inventory to strengthen off-take and project funding negotiations	Mar 2021	✓
Enhanced Feasibility Study - incorporating **NIMCIX Ion Exchange columns, vastly reduced execution risk**	Jun 2021	✓
Progress off-take negotiations and project financing efforts		Ongoing
Develop a plan for increasing production profile and extending mine life through development of satellite resources		Ongoing
Maintain a strong exploration focus, drilling scheduled to recommence in November 2021		Ongoing

Source: BOE, December 2021

EFS a recent catalyst

Revenue and Ebitda variances versus the EFS is driven by uranium price assumptions

The recent Enhanced Feasibility Study (EFS) highlighted a 11-year mine life at Honeymoon, producing 21.81mlb of U_3O_8 at a AISC of US$25.62/lb and capital expenditure of A$107m or US$80m. We note BOE used a LOM average uranium price of US$60/lb and an exchange rate of 0.75 US$/A$.

Our forecasts are largely in line with the EFS, with key variances being our revenue and Ebitda LOM forecasts of A$1,877m and A$1,166m respectively being 10% ahead of the EFS due to variances in uranium and FX over the LOM. Our FCF over the LOM is 4% higher than the EFS as we forecast higher sustaining capital expenditure and have included a closure cost at the end of the current forecast lift of mine.

Fig 20 Our base case forecasts are largely in line with the recent enhanced feasibly study

EFS versus Macq		2021 EFS	Macq	Variance
Life of Mine	*Years*	11	11	0%
Uranium production	*Mlb*	21.81	22.05	1%
LOM Revenue	*A$m*	1,705	1,877	10%
LOM Ebitda	*A$m*	1,058	1,166	10%
Ebitda Margin	*%*	62%	62%	0%
LOM FCF	*A$m*	567	591	4%
Cash Cost	*US$/lb U_3O_8*	18.46	18.06	(2%)
AISC	*US$/lb U_3O_8*	25.62	26.25	2%
Capex	*A$m*	107	107	(0%)
NPV	*A$m*	412	440	7%
IRR	*%*	47%	48%	3%

Source: BOE, Macquarie Research, December 2021

Key investment highlights

In our view the project provides a compelling investment angle to the uranium recovery story and global decarbonisation and electrification due to:

- **Fully licensed**: BOE is fully licensed to restart the Honeymoon. Key South Australian approvals held by Honeymoon include a current Mineral Lease and a supporting PEPR, relevant EPA licences for Uranium Mining and Processing, with a supporting RMP and RWMP. The project also holds an approved Transport Management plan for the transfer of uranium ore concentrate (UOC) from the facility to Port Adelaide. Federal permits to Possess Nuclear Material and to ensure the security of UOC are also held by the project. Federal Export permissions for UOC are also in place and have recently been renewed by the Federal Department of Industry Science, Energy and Resource.
- **Time to market:** BOE has stated that time to first production could occur in a relatively short period of time, with the project execution plan highlighting a ~62-week timeline from FID to first production and then a further 75 weeks to full production of 2.45mlb as stated in the EFS. We note that BOE also has 1.25mlb of physical inventory which can be used to supplement sales in the ramp-up phase, allowing for more flexibility in inventory management.
- **Expanded production capacity:** BOE currently has export licenses for 3.3mlb of U_3O_8 per annum, however the EFS has outlined a 2.45mlb peak production scenario. We believe the conversion of additional resources and a decision to expand the processing facility could see production increase to closer the capacity. Additionally. Resource conversion could increase the LOM beyond the current 11 years we have forecasts and highlighted in the EFS.
- **Tier 1 justification**: Global production is concentrated to Kazakhstan, Canada, Australia and Namibia. We believe that Honeymoon being situated in South Australia, which has a stable government and well-established uranium rules, is a positive.
- **Offtake flexibility**: 100% of Honeymoon's potential production is currently not subject to contracts or offtakes. Therefore, BOE has the flexibility to enter contracts when the market recovers further, enabling it to secure better terms for contracts.
- **Resource and exploration upside**: The EFS currently utilises only ~50% of the current mineral resources defined in the mining inventory. Inclusion of the additional resources has potential to increase annual production and/or extend the LOM. Additionally, BOE has large prospective tenements where exploration is currently underway and could further increase the resources.

Resource upside is material

Converting the resources outside of the HRA into minable inventory is a key catalyst

BOE's Honeymoon global resource was recently increased to 52.4Mt at an average grade of 620 ppm U_3O_8 containing a total of 71.6Mlbs U_3O_8 using a 250ppm U_3O_8 cut-off. We note that the resource is split between the Honeymoon restart area (24.1mt at ~667ppm U_3O_8 for 36.0mlb of contained U_3O_8) and the Jasons and Gould Dam areas (which contains 28.3mt at ~579 ppm U_3O_8 for 36.0mlb of contained U_3O_8).

Based on the JORC Resource of Honeymoon's HRA of 36Mlb of U_3O_8, Honeymoon has a mine life of plus-10 years at a forecast production rate of 2.45Mlb/annum. ML6109 sits on top of the Honeymoon Restart Area (HRA) and 26.6mlbs of U_3O_8 is classified as Measured and Indicated. There is a further 35.6Mlb in JORC Resources outside the HRA and significant exploration potential.

Fig 21 ~50% of the current resource is included in the LOM plan

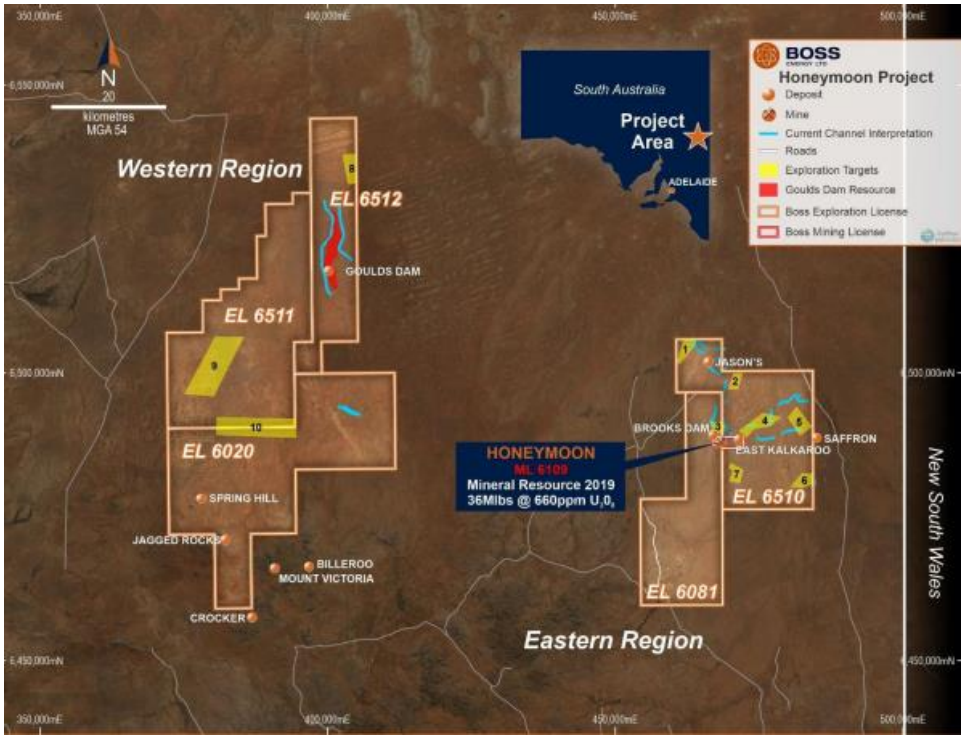
Project		Ownership	Total Resource	ppm U_3O_8	Contained metal (kt, U_3O_8)	Contained metal (Mlb, U_3O_8)
Honeymoon	Measured	100%	3.1	1,100.00	3.41	7.52
	Indicated	100%	14.0	610.00	8.54	18.82
	Inferred	100%	7.0	590.00	4.13	9.10
Total Honeymoon		**100%**	**24.1**	**667.22**	**16.08**	**35.44**
Honeymoon (ex HRA)	Measured	100%	-	1,100.00	-	-
	Indicated	100%	4.4	630.00	2.77	6.11
	Inferred	100%	23.9	570.00	13.62	30.03
Total Honeymoon (ex HRA)		**100%**	**28.3**	**579.33**	**16.40**	**36.14**
Total Resources			**52.4**	**623.27**	**32.66**	**71.99**

Source: BOE, Macquarie Research, December 2021

BOE has large exploration tenements around Honeymoon

In March 2019, BOE updated its Exploration Target range for the Project, which is in the range of 28Mt to 133Mt of mineralisation at a grade of 340ppm to 1,080ppm U_3O_8 for a contained 58 to 190Mlbs U_3O_8 (26,300 to 86,160 tonnes of contained U_3O_8), using a cut-off grade of 250ppm U_3O_8. This highlights the material upside present from exploration and brining in further resources.

Fig 22 The is significant exploration upside on the large Honeymoon tenements



Source: BOE, December 2021

Production upside given license capacity

We expect an FID in CY22 and first production in CY23

We believe there is scope for BOE to complete early works at Honeymoon, allowing it a significantly quicker timeline to first production from FID. We have assumed early works to commence in 1H CY22, with an FID in mid-CY22 (aligning with an increase in forecast uranium contract pricing) and first production in CY23 (0.43mlb).

Production is expected to peak at 2.45mlb

NICMIX installation and ramp-up is forecast to occur over the next 24 months with production increasing to a steady state of 2.45mlb by FY26 until FY31. Grade declines from FY32 onward results in a reduction in production to end of mine life in FY35. We have forecast production and sales of 22.0mlb of U_3O_8 over the 11-year LOM.

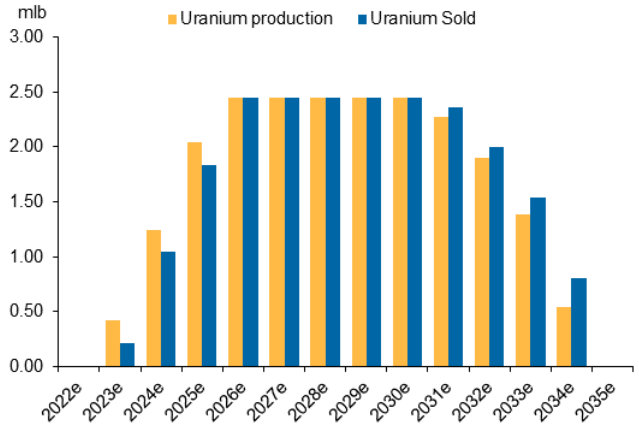
BOE has 1.25mlb of physical inventory

We note that there is upside risk to the LOM assumptions should additional resources be delimitated or the remaining Ex-HRA resources be included in the mine plan. We also note that sales could exceed our assumptions in the ramp-up phase as BOE would have the flexibility and optionality to sell its 1.25mlb of physical inventory.

The capacity licence of 3.3mlb per annum is above EFS production levels

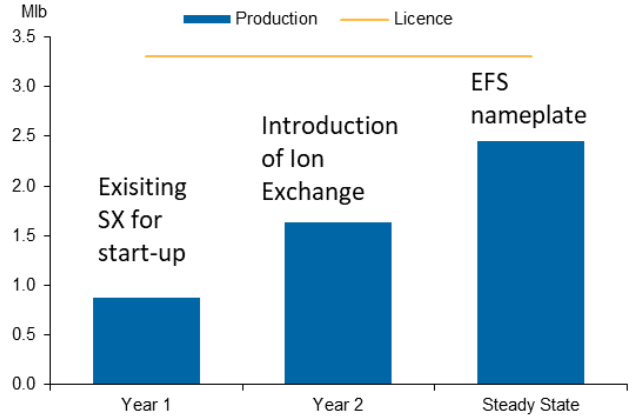
BOE currently has export licenses for 3.3mlb of U_3O_8 per annum, however the EFS has outlined a 2.45mlb peak production scenario. We note that initial production will utilise the existing Solvent Exchange (SX) plant which can produce up to 0.88mlb per annum and during ramp-up the Ion Exchange (IX) plant will be introduced to increase production to a steady state of 2.45mlb per annum. We note that resource conversion and modular increasing of the plant provides upside to production, given the licence of 3.3mlb per annum.

Fig 23 Steady production of 2.45mlb expected



Source: BOE, Macquarie Research, December 2021

Fig 24 License of 3.3mlb above production forecasts



Source: BOE, Macquarie Research, December 2021

Costs weighted to processing and capex to occur over start up and ramp-up

BOE expects cash costs of A$24.63/lb

In the EFS, BOE highlighted LOM cash costs of A$24.62/lb (US$18.47/lb) and AISC of A$34.16/lb (US$25.62/lb). We note that our forecasts are largely in line with the EFS on a nominal basis. We note that much of the cost is skewed to the process plant at ~A$22.0/lb while the well field costs are only A$2.62/lb. We also note that reagents (36%), labour (29%) and power (15%) are the largest sources of cash costs for BOE. BOE has also forecast LOM sustaining capex of A$97.4m in the EFS, which is below our A$125m estimate.

Operating costs are highly weighted to processing

Fig 25 BOE expects cash costs of A$24.63/lb (US$18.47/lb)

Annual cash costs	A$m/pa	A$/lb/pa
Labour	13.99	7.06
Power	7.45	3.76
Reagents and consumables	17.47	8.81
Maintenance	5.21	2.63
Laboratory	0.56	0.28
General and Administrative	4.14	2.09
Total	**48.82**	**24.63**
US$ (@ AUD:USD 0.75)	36.62	18.47

Source: Company data, Macquarie Research, December 2021

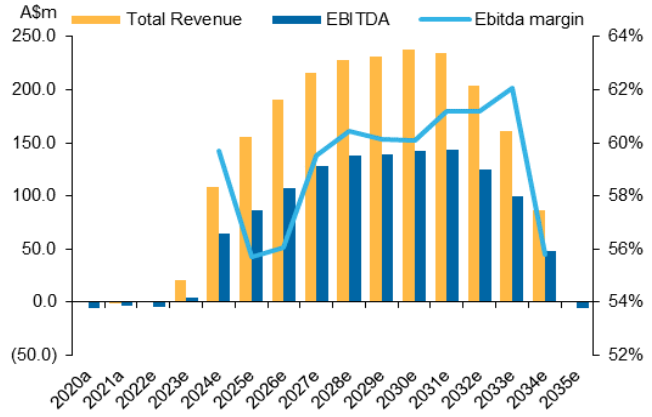
Our Revenue and Ebitda forecasts are above the EFS estimates

Our LOM revenue forecast is A$1,877m, generating Ebitda of A$1,166m at a margin of 62%

Our revenue and Ebitda forecasts are highly sensitive to uranium pricing assumptions and the level of contracting versus spot price sales BOE will undertake. In our base case we assume that 50% of LOM production is contracted and sold at US$60/lb (escalated from CY22), while the remaining sales are at spot prices which on our forecasts peak in FY24 before retreating over FY25 and FY26 and then settling and escalating from the long-term assumed price of US$55/lb.

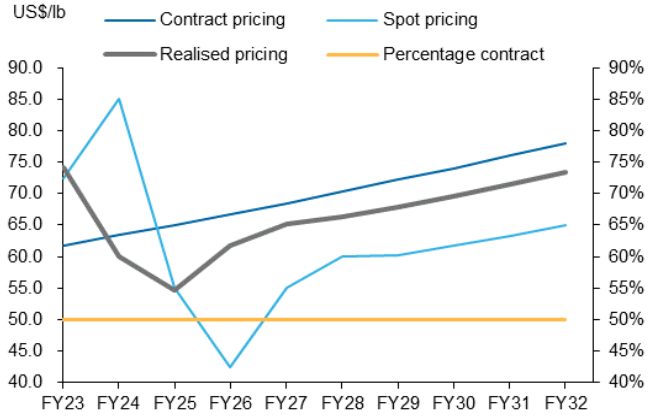
We have assumed first production and sales in FY23, then ramping up strongly over the next 2 years. Our LOM revenue forecast is A$1,877m, generating Ebitda of A$1,166m at a margin of 62%. We note that revenue peaks at A$237m and Ebitda at A$143m in FY30 on our current forecasts. We note that our LOM revenue and Ebitda forecast are above those reported in the EFS due to variances in uranium prices.

Fig 26 We expect LOM Ebitda margin of 62%



Source: BOE, Macquarie Research, December 2021

Fig 27 We have forecasts 50/50 contracting to spot prices



Source: BOE, Macquarie Research, December 2021

Strong cash flow expected over the LOM

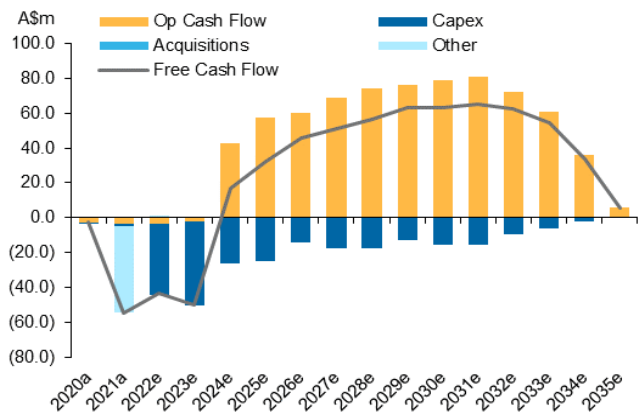
We have forecast LOM FCF of A$591m

We have forecast capex of A$107m during development and restart, which is in line with the expected capex stipulated in the EFS. We note that capex spend is split prior to first production and during ramp-up, with additional NIMCIX modules and additional wells being the core capital spend in the ramp-up. We have forecast LOM FCF of A$591m, which is 4% above the EFS.

10% increase in realised pricing increasing our NPV by 16%.

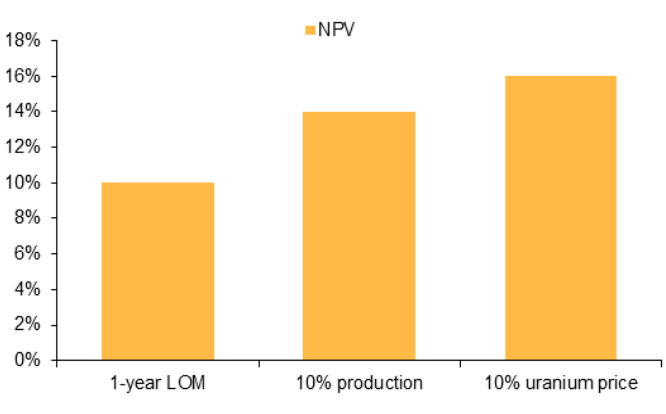
We value the initial Honeymoon restart operation, using the EFS production profile, at A$440m or A$1.31/sh. We note there is upside to our valuation via increased production, extension of the LOM and higher uranium prices. A 1-year increase in LOM would lift NPV by 10%, while a 10% increase in production would increase our NPV by 14%. Uranium prices have the largest impact, with a 10% increase in realised pricing increasing our NPV by 16%.

Fig 28 Free cash flow of A$591m expected over the LOM



Source: BOE, Macquarie Research, December 2021

Fig 29 NPV is sensitive to production and uranium prices



Source: BOE, Macquarie Research, December 2021

ISR mining overview

Honeymoon will utilise the in-situ recovery (ISR) method of mining

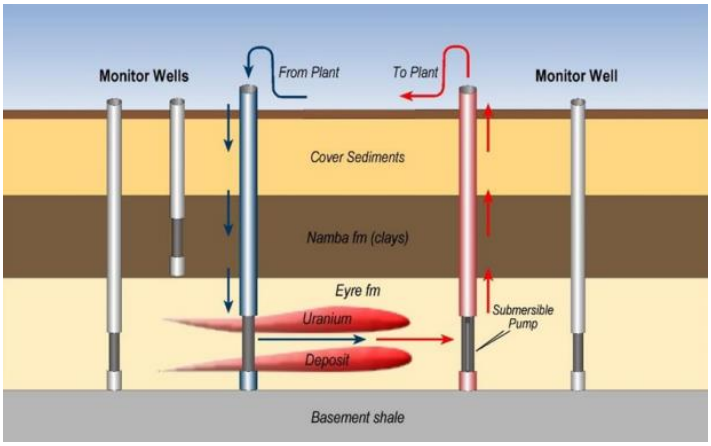
Honeymoon will utilise the in-situ recovery (ISR) method of mining, which is currently used for ~55-60% of global uranium production (mainly in Kazakhstan and Uzbekistan). The ISR process involves the placement of numerous wells in specific patterns, with the most common being a central extractor well and four to six injector wells drilled at varying spacing around the extractor. Pipework connects the injector and exactor wells to the processing plant.

ISR accounts for 55-60% of global uranium production

During mining, a leaching liquid is pumped into the orebody via the injector wells, which circulates within the orebody and dissolves the uranium mineralisation (in-situ). The now uranium-rich impregnated fluid is then pumped to surface via the extractor wells and then pumped to the processing plant.

Once the impregnated (uranium-rich) liquid is run through the processing plant, separating the uranium and producing U_3O_8, the now barren liquid is recycled and regenerated with acid and oxidants before being returned into the wellfields to repeat the dissolution process.

Fig 30 In-situ recovery (ISR) is the preferred mining method at Honeymoon



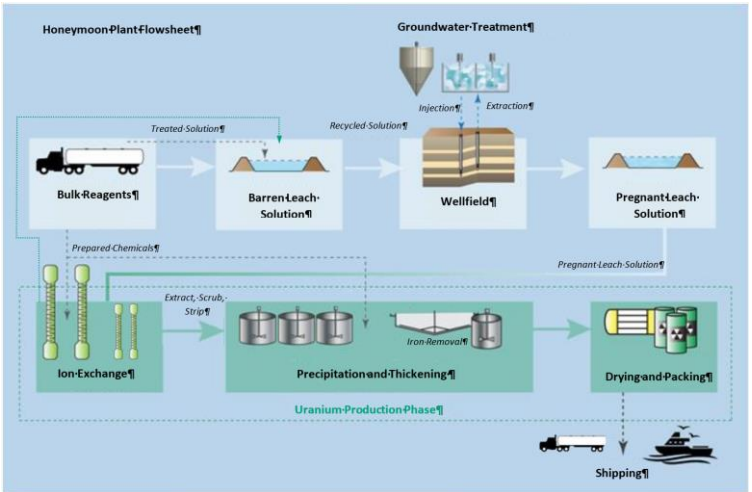
Source: BOE, December 2021

Processing the key step:

Ion Exchange (IX) NIMCIX modules will be the main source of recovery

The existing Honeymoon solvent exchange (which will initially be used for production) will be replaced in the start-up phase by Ion Exchange (IX) NIMCIX modules as the main source of recovery. Additional NIMCIX modules will be installed over ramp-up to increase processing and production to 2.45mlb per annum at the peak as per the EFS. Uranium attaches to a resin in the IX process which then drops out from the liquid and is then separated, dried and packages as U_3O_8.

Fig 31 Processing flow sheet



Source: BOE, December 2021

Board and Management

We believe BOE has established a strong board and management team, which is complemented by key personnel and industry leading consultants. The following is summarised from https://www.bossenergy.com/ and company releases.

Board of Directors

Non-Executive Chairman – Peter O'Connor

Mr O'Connor has extensive global experience in the funds management industry, and has worked with public and private companies in developed and emerging economies. He was co-founder, director and deputy chairman of IMS Selection Management Ltd, which had $10 billion under management or advice from 1998-2008. Following the sale of IMS to BNP Paribas in 2008, he was deputy chairman of FundQuest UK Ltd, with $10 billion under management. FundQuest globally had $35 billion of assets under management from 2008-2010.

Mr O'Connor has been a Non-Executive Director of ASX 100 company Northern Star Resources Ltd (ASX: NST) since 2012, during which NST has grown its market cap significantly to $9 billion. He is also a Non-Executive Director of Blue Ocean Monitoring Limited.

Managing Director and Chief Executive Officer– Duncan Craib

Mr Craib is Managing Director and CEO having joined the company on 9 January 2017. He is a Chartered Accountant by profession specialising in the mining, having gained vast experience in executive roles held in Australia, United Kingdom, Namibia, and China. For the past 12 years Mr Craib's career has been dedicated to the uranium industry.

Prior to commencing with Boss Energy, Mr Craib served as Finance Director to Swakop Uranium (Pty) Ltd and was heavily involved in the US$2.5 billion development and construction of its world class Husab uranium mine in Namibia. Its principal shareholder CGN, is the largest nuclear power operator in China and largest nuclear power constructor world-wide. Husab was commissioned in 2016, upon which Mr Craib was recruited to join Boss Energy.

Non-Executive Director – Bryn Jones

Adelaide-based Mr Jones (MMinEng) is an industrial chemist and a Fellow of the Australian Institute of Mining and Metallurgy (AusIMM), with more than 20 years of experience in the Australian uranium industry. He has worked in all aspects of the mining cycle, particularly in uranium in-situ recovery (ISR) and mine development and production.

Mr Jones spent nearly 10 years in roles with ISR uranium producer Heathgate Resources, owned by US based nuclear company General Atomics. Heathgate is the owner and operator of the Beverley and Beverley North Uranium Mines in South Australia. Most recently he has been Chief Operating Officer of Canadian-based uranium developer Laramide Resources (ASX/TSX: LAM, OTC: LMRXF). Laramide has a portfolio of uranium US-based assets.

Non-Executive Director – Wyatt Buck

Mr Buck's Uranium experience began with Cameco Corporation, where he was employed for 15 years between 1991-2006 in various roles, culminating as GM of the McArthur River Uranium Mine and Key Lake Mill, the largest Uranium mining operation in the world.

He then held senior operational roles with Paladin Energy Ltd (ASX: PDN) as General Manager and Managing Director of the Langer Heinrich Uranium Project in Namibia from the commencement of construction in February 2006 through to design level production. From September 2009 to May 2011, Mr Buck was Executive GM Operations at Paladin with direct operational responsibility for its Langer Heinrich and Kayelekera Uranium projects. Since 2011, Mr Buck has acted as Operations Director with First Quantum Minerals (TSX: FM), overseeing mining operations in Finland, Spain, Turkey, Australia and Mauritania.

Non-Executive Director – Dudley Kingsnorth

Mr Kingsnorth (FAusIMM) has extensive executive experience in the international mining sector including positions with Bechtel, Alcoa, Shell (Billiton), Rio Tinto, Ashton Mining and Greenbushes. His career includes a focus on comprehensive management of process development, project feasibility studies and project development through to successful mine start-up that is fully cognisant of market demands

Technical experts, consultants and key management

Strategic and Marketing Advisor– Sashi Davies

Ms Davies has more than 35 distinguished years of experience in the international uranium sector. She has extensive marketing expertise and an in-depth uranium knowledge base, having developed long-lasting relationships with international utilities and off-takers. Most recently, she was GM and Director of CGN Global Uranium Ltd and Head of Marketing for Extract Resources

In April 2020, Ms Davies was appointed to the World Nuclear Fuel Markets (WNFN) Board of Governors. The WNFM was established in 1974 to promote international commerce in nuclear fuel materials. WNFM membership comprises about 76 companies representing around 21 countries, and is dedicated to facilitating trade of nuclear materials and increasing the availability of accurate, timely and useful price information to the industry

Project Manager – Jon Owen

Mr Owen has extensive global experience in project management and development, including 10 years with First Quantum Minerals as a Project Manager on the African Sentinel Copper/Nickel development and more recently in handing over the Cobre Panama Copper/Gold processing plant.

Working in all aspects of the project lifecycle from feasibility to handover for 25+ years, Mr Owen brings a strong focus on selfperform project execution and efficient EPCM utilisation, with >12 years at Outotec managing in the project and engineering offices in Australia and Africa.

Processing Manager – Trevor Robinson

Mr Robinson has over 35 years of professional experience. His expertise is in the evaluation, design, construction, commissioning and management of metallurgical projects: including uranium, nickel, gold, and copper. His expertise is in study management, design and commissioning of complex hydrometallurgical plants for several delivery companies as a design engineer, discipline lead, project manager, and functional manager.

Trevor's significant uranium experience includes NIMCIX ion exchange commissioning and operation in Namibia which is very relevant to Honeymoon. Additional uranium experience has been gained at Olympic Dam, Ranger and Rossing.

GM Wellfield and Resources –Ben Jeuken

Ben Jeuken, has been appointed General Manager – Wellfield and Resource. Based in South Australia, Mr Jeuken is well known and highly regarded by industry peers in the practical management of groundwater for mining projects specifically InSitu Recovery (ISR) uranium mining. His considerable experience includes technical engagements on neighbouring ISR uranium producer Heathgate Resources, the owner and operator of the Beverley and Beverley North Uranium Mines located 260km to the west of Honeymoon, and consulting to the International Atomic Energy Agency in developing uranium mining groundwater remediation guidelines.

NIMCIX Ion Exchange – Merrill Ford

Dr Merrill Ford is an independent metallurgical consultant. He educated as a chemical engineer in South Africa, in mineral process design at Imperial College, London and gained his Ph.D. from the University of Witwatersrand. He spent several years in the field of uranium extraction metallurgy, the design of NIMCIX columns for IX systems, the development of resin-in-pulp technology for gold and uranium and the modelling of uranium leaching.

He joined ANSTO in March 2003 as Manager Special Projects, and from July 2008 until April 2016 he was Manager Metallurgy for Paladin Energy, becoming an independent consultant in 2016. As an independent consultant to the uranium industry Merrill has provided input to feasibility and operational studies for a number of uranium clients, including Cameco, Paladin, Energy Metals, and Swakop Uranium.

Geology Manager – Jason Cherry

Based in South Australia, Mr Cherry, an experienced uranium exploration geologist of 17 years, has worked on various mining styles of uranium mineralisation, with several years on Honeymoon where he was intricately involved in discovering new uranium resources including the satellite deposits Jasons and Goulds Dam. Mr Cherry subsequently applied his mineral exploration and management experience with uranium companies Vimy Resources and Toro Energy.

ESG Considerations

ESG commentary provided by Macquarie's ESG analyst, Anita Stanley (Anita.Stanley@macquarie.com, Ph: +61 437 435 927).

Governance

Board

The BOE Board comprises 3 non-executive directors and the CEO. Of the three NEDs, two NEDs are considered independent. There are no female representatives on the BOE board.

Fig 32 Board overview

Company	Board member details	Number of Directors (including CEO)	% of Independent Directors (excluding CEO)	% of Women on the Board	Average Tenure (in years)	No. of directors that hold other directorships in listed companies
BOE	BOE Board	4	67%	0%	2.0	3

Source: Company data, Macquarie Research, December 2021

Remuneration

BOE's remuneration structure consisted of fixed salary and LTI. During FY21, BOE undertook a review of its remuneration and the key outcomes included: increasing the CEO's base salary and introducing a new STI and LTI program with zero exercise price options (ZEPOs).

Fig 33 CEO remuneration structure for period commencing 30 June 2020

Component	Instrument	Performance Period	Comment	Value
Fixed base salary	Cash payment	Annual basis	n/a	Base salary, superannuation & other non-cash benefits. 70% of total remuneration package.
LTI	Long-term options and shares	3-3.5 years	Performance hurdles – no detail provided	Long-term granted options/shares are valued at 47% of base salary for the CEO, equivalent to 30% of total remuneration package.

Source: Company data, Macquarie Research, December 2021

Social

Safety

Uranium mining can have serious health effects for the direct miners as well as the communities surrounding the mine sites. BOE's Honeymoon restart project is an in-situ recovery uranium mine with most of the orebody's radioactivity remaining underground throughout operation. This results in a minimal release of radon gas and little ore dust is produced, which results in a much lower risk profile for the mine's operations.

Modern slavery

BOE does not currently publish a Modern Slavery Statement as its annual consolidated revenue is below the reporting requirement threshold of A$100m. The company has ten employees across the organisation with the mine site based in South Australia.

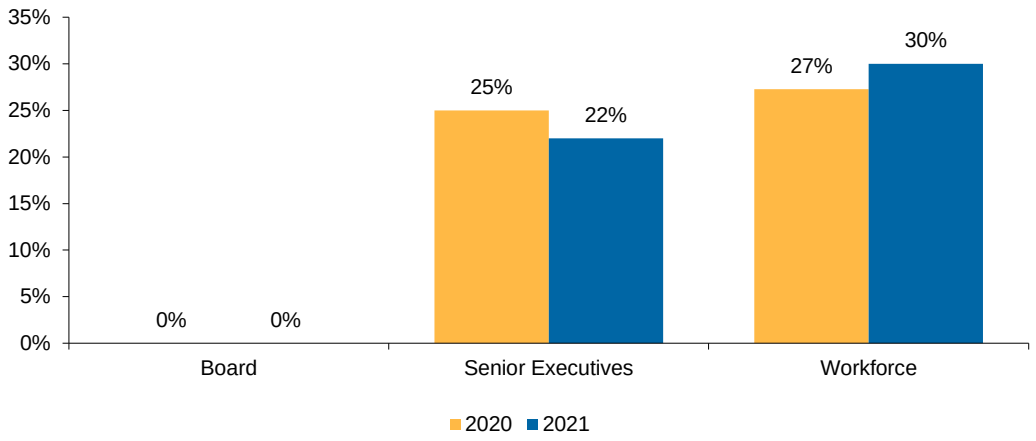
Indigenous engagement

As Honeymoon is not a large open cut mine site, it does not face the same environmental impact concerns that other Australian uranium mine sites do. In addition, the company has flagged that it is fully permitted and all of its Native Title Agreements are in place to proceed to commence operations. Historically the project has been supported by indigenous communities in the area, though anti-nuclear sentiment in indigenous communities is a potential factor to monitor.

Diversity

BOE has not set a specific diversity target. Currently, there are no female representatives on the BOE board. Across the senior executive level, there is 22% female representation and more broadly, 30% female representation across the workforce.

Fig 34 Women in the workforce



Source: Company data, Macquarie Research, December 2021

Environmental

Uranium mining can have widespread environmental impacts, including radioactive waste and water contamination and water-borne toxins. Nevertheless, BOE is conducting in situ leach (ISL) mining which generates much less surface disturbance than open cut and underground mining operations. With ISL mining the production of tailings is avoided and leads to a much simpler rehabilitation process.

Groundwater Pollution

The main environmental consideration with ISL is avoiding pollution of groundwater that is near the orebody. BOE has redesigned their wellfields and the existing water treatment plant at Honeymoon to ensure proper management of the waste liquid produced.

Biodiversity impact

With ISL, the environmental footprint is minimal and therefore we expect BOE's impact on biodiversity to be lower than other uranium mine sites. Nevertheless, Honeymoon is located in South Australia which has a rich environmental ecosystem and potential negative biodiversity impacts remain a risk.

Other environmental risks include: GHG emissions from operations, air quality, waste and hazardous materials management and mine closure plans.

Nuclear as a Clean Energy Source

Despite ranking as the second largest source of low-carbon electricity worldwide, nuclear energy remains a controversial ESG topic for many investors. On the one hand, nuclear energy is seen as an appealing option to help many countries meet their net zero commitments. Though on the other, there are serious concerns around nuclear waste disposal, the potential for weapons proliferation as well as the devastating consequences of accidental radiation.

Nuclear weapons are already excluded from many ESG-focused funds, and given the increasing focus on supply chain inputs there is potential for greater focus and restrictions around downstream operations such as uranium mining.

Uranium Market takes first step to rally

We expect a near-term rally in uranium prices

We are positve on the outlook for uranium prices driven by:

- **1)** forecast demand exceeding mine supply over the longer-term;
- **2)** an increase in utilites contracting levels;
- **3)** price discovery been driven by physical purchases from non-consuming market entities, and
- **4)** global decarbonidation and electricifation, with uranium returning to the energy mix globally.

Fig 35 We have updated our forecasts for uranium, and are bullish in the near-term with incentive pricing expected

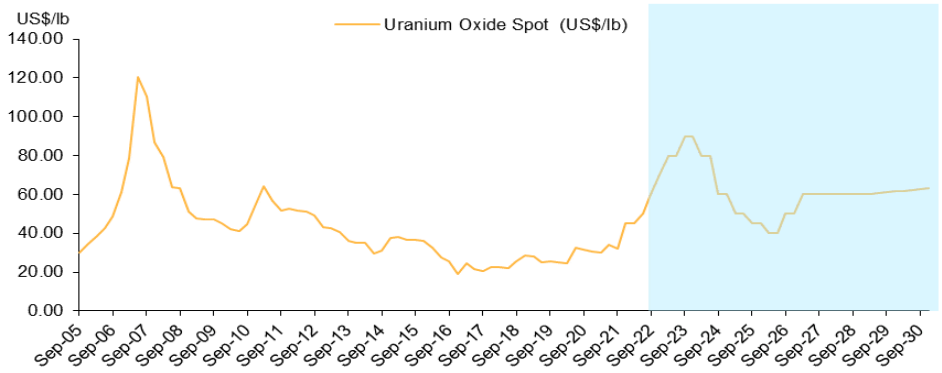
	2020a	2021e	2022e	2023e	2024e	2025e	2026e	2027e	2028e	2029e	2030e
Uranium Oxide Spot (US$/lb)	26.9	31.6	43.0	72.5	85.0	55.0	42.5	55.0	60.0	60.3	61.7
US$/A$	0.72	0.67	0.75	0.73	0.74	0.71	0.71	0.70	0.70	0.70	0.70

Source: Macquarie Research, December 2021

We have forecast long-term uranium prices of US$55/lb

Given the low level of utility contracting currently, we believe that a price rally would induce contracting for surety of supply which would result in a frenzy of contracting driving up uranium prices in the near to medium term. In the longer-term we expect price support as new supply requires incentive pricing north of US$55/lb.

Fig 36 We expect a price peak in 2024 and long-term pricing of US$55/lb

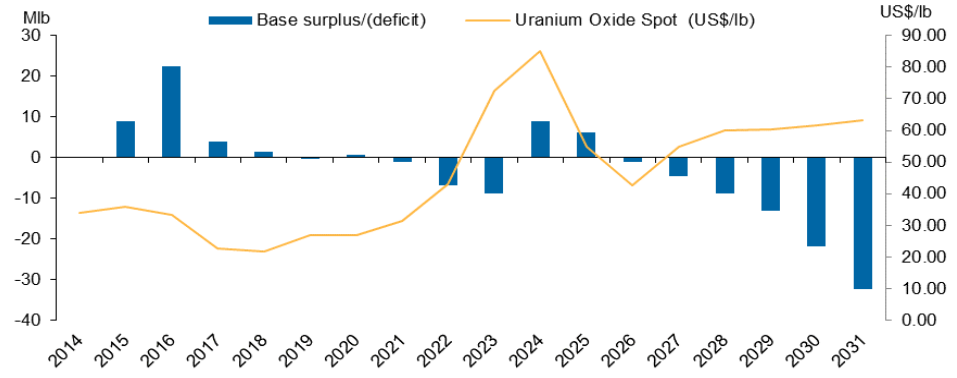


Source: Bloomberg, Macquarie Research, December 2021

We expect Uranium prices to peak in 2024

We envision a price increase to ~US$80/lb over CY22-24 driven by the above factors, prior to latent capacity and new supply coming online resulting in a “normalisition” of uranium prices. In the longer-term (CY26 onward), we believe uranium prices would need to be above US$55/lb to incentivise new supply.

Fig 37 Near-term supply/demand deficit to drive a rally in uranium pricing



Source: World Nuclear Association, Company data, Bloomberg, Macquarie Research, December 2021

Demand driven by Asian reactor construction

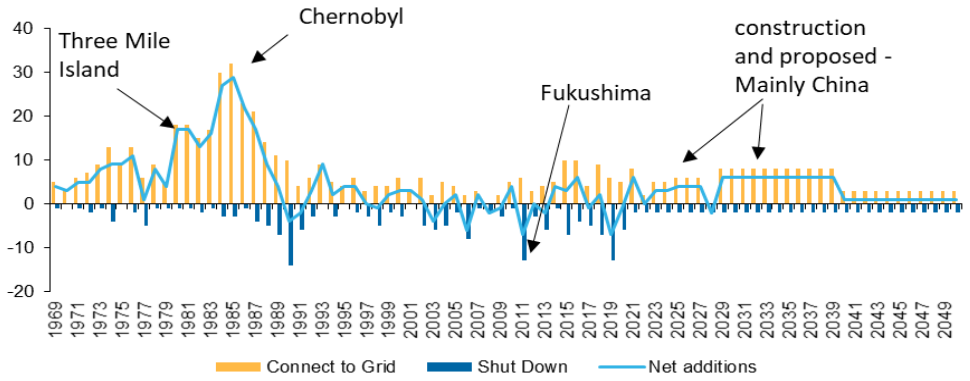
disasters such as Chernobyl and Fukushima have driven a suppression in nuclear reactor development

Nuclear reactor buildouts increased significantly from the late 1960 to the Chernobyl disaster in the mid-1980s, despite increased public opposition after the Three Mile Island incident a few years prior. A large proportion of the reactor build out during the period was in the USA, Europe (particularly France) and Japan.

China is the key driver of demand in the medium-term

Post Chernobyl, reactor connections to the grid to the end of the 1980s were largely from those commissioned over the prior decade. Over the next 20 years the level of operating reactors was largely stable, however new reactor start-ups were gradually shifting from western nations to the east. In 2011, the Fukushima disaster again hampered the outlook for uranium power, with reactors shutdown and numerous proposed projects being scrapped. The current forecast by the nuclear association for construction and proposed reactors are slated for China, where small modular reactor (SMR) technology is rapidly being adopted.

Fig 38 Nuclear disasters have resulted in a tempering of demand for new reactors



Source: World Nuclear Association, Macquarie Research, December 2021

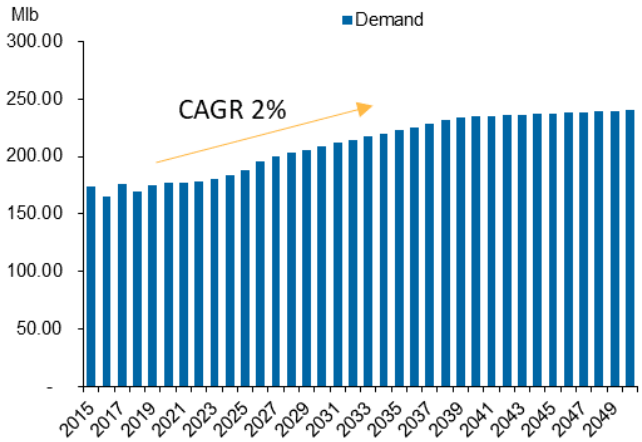
10% of the world's annual power requirements are generated from nuclear energy

We note that France is a world leader in nuclear power, with ~70% of domestic power being generated from nuclear (from ~55 reactors). Notably, Eastern European countries such as Slovakia, Ukraine, Hungary and Bulgaria generate 40-50% of their energy from nuclear power. USA generates ~20% of its power from nuclear (~90 reactors), China Currently 5% (from ~50 reactors) and Japan 5% (from ~30 reactors). 10% of the world's annual power requirements are generated from nuclear energy, a level which is expected by the World Nuclear Association (WNA) to be maintained over the next decade.

We forecast 2% demand CAGR over the next decade

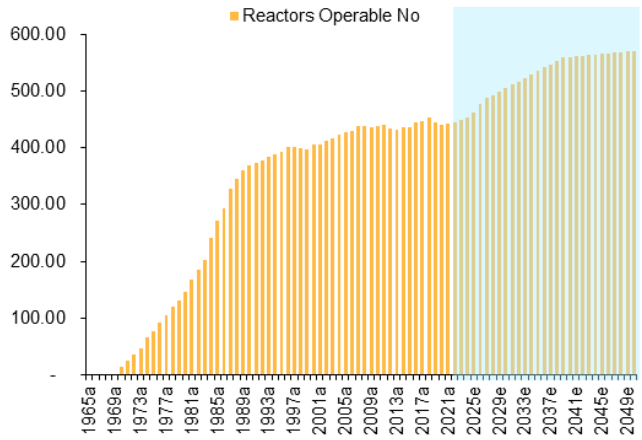
We have forecast an increase in operating reactors over the next 20 years, particularly from China, and expect an increase in the life of current reactors as safety and regeneration programmes are improved. This drives the 2% CAGR in demand over the next decade, which is in line with the WNA base case forecasts.

Fig 39 2% CAGR in demand for Uranium over next decade



Source: WNA, Macquarie Research, December 2021

Fig 40 New reactors largely weighted to China



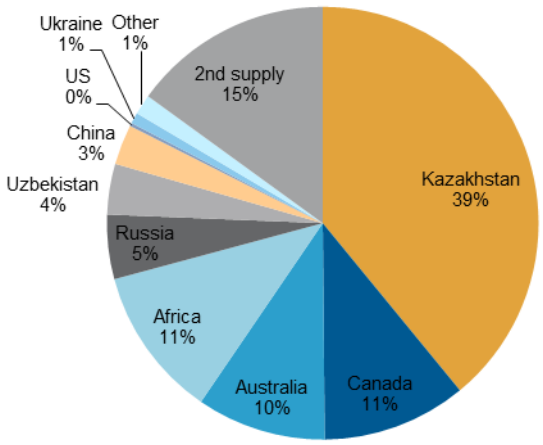
Source: WNA, Macquarie Research, December 2021

Supply needed in the near-term

Kazakhstan, Canada, Australia and Namibia account for the majority of global production

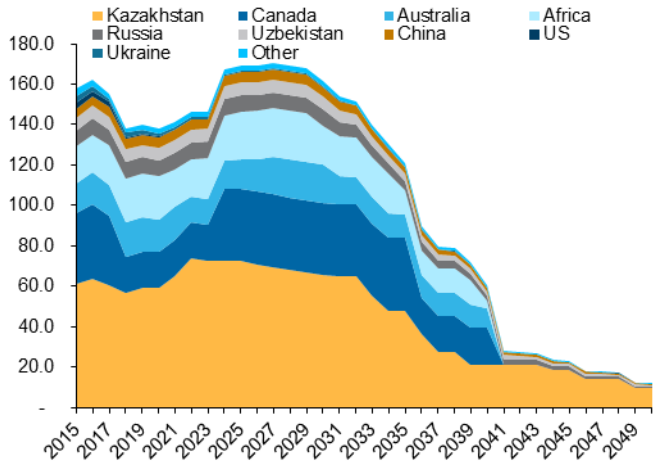
Current supply is concentrated to four major regions, with Kazakhstan being the major global producer with a ~40% share. Kazatomprom, being the Kazakh national producers, has an interest in all operations within the country. Canada is the second largest producer, with Cameco's Cigar Lake (the world's largest producing uranium mine) accounting for a majority of the production. In Australia, 10% of world supply, the supply is concentrated in South Australia from Olympic Dam and Beverly while in Africa much of the supply is from Namibia (China National Nuclear Corporation operated).

Fig 41 majority of production is from four countries



Source: NWA, Macquarie Research, December 2021

Fig 42 Supply expected by us to decline materially from 2030



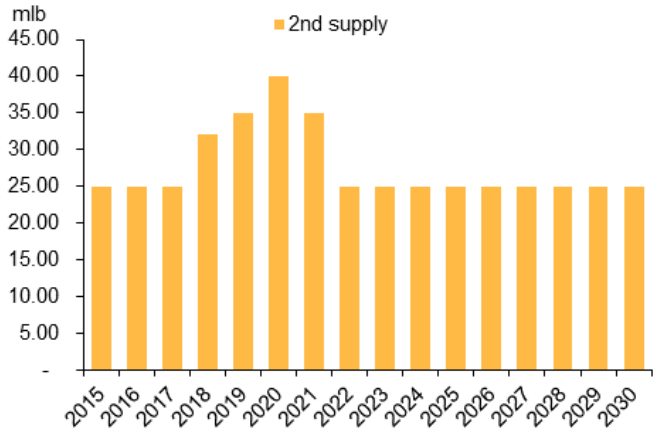
Source: Company reports, Macquarie Research, December 2021

We expect near-term supply from latent Kazakh supply, and restarts of MacArthur River, Langer Heinrich and Honeymoon

Our near-term supply forecasts include a resumption of Kazakhstani latent capacity (4.0mlb), a re-start of MacArthur River in Canada (16.0mlb); a restart of Langer Heinrich in Namibia (5.2mlb) and a re-start and ramp-up of Honeymoon in Australia (2.4mlb). While this latent and restart supply is sufficient, on our forecasts, in the near-term to satisfy demand; we believe that in the longer-term (with current reserves being depleted towards the end of the decade and beyond) incentive pricing would need to be maintained to bring on new mine supply and satisfy demand.

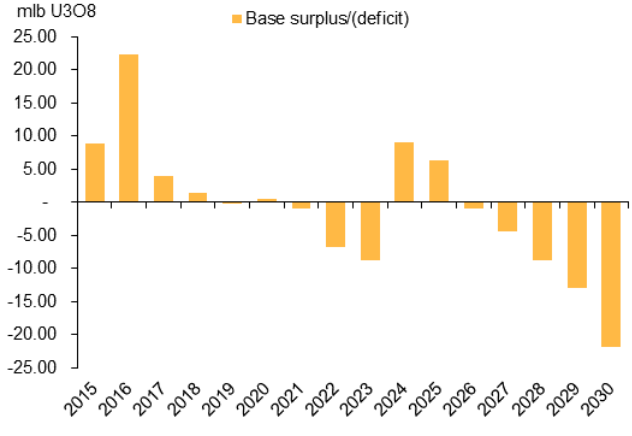
Another risk is secondary supply (de-weaponization and tailing reprocessing), which has filled in the demand gap over the last 20 years (we note that demand has outstripped supply over this period). We note that secondary supply is opaque, but the World Nuclear Organisation expects ~20-25mlb per annum to come from this source. A reduction in secondary supply would further deepen the forecast demand deficit.

Fig 43 Secondary supply forecast to remain at 20-25mlb



Source: NWA, Macquarie Research, December 2021

Fig 44 Supply deficit in the near-term and longer-term



Source: NWA, Macquarie Research, December 2021

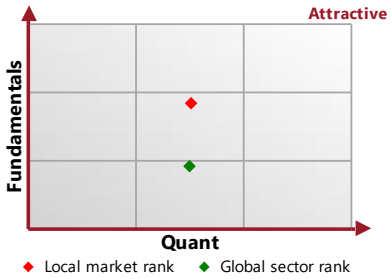
Macquarie Quant Alpha Model Views

The quant model currently holds a neutral view on Boss Energy. The strongest style exposure is Price Momentum, indicating this stock has had strong medium to long term returns which often persist into the future. The weakest style exposure is Quality, indicating this stock is likely to have a weaker and less stable underlying earnings stream.

210/418

Global rank in
Oil, Gas & Consum. Fuels

% of BUY recommendations	100% (4/4)
Number of Price Target downgrades	0
Number of Price Target upgrades	0

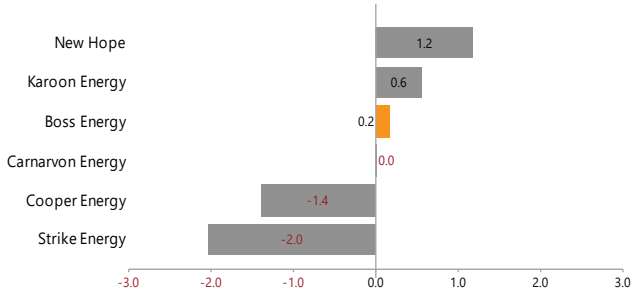


Displays where the company's ranked based on the fundamental consensus Price Target and Macquarie's Quantitative Alpha model.

Two rankings: Local market (Australia & NZ) and Global sector (Oil, Gas & Consum. Fuels)

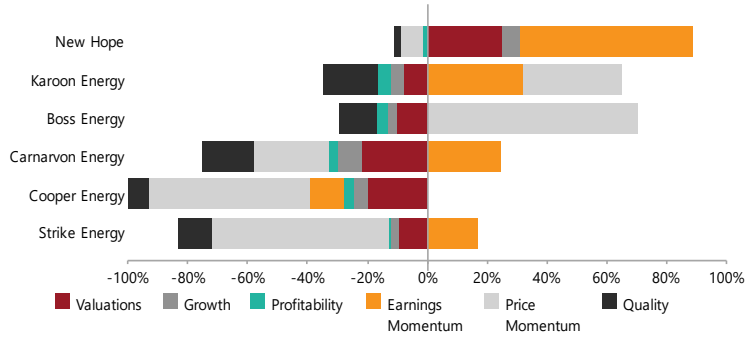
Macquarie Alpha Model ranking

A list of comparable companies and their Macquarie Alpha model score (higher is better).



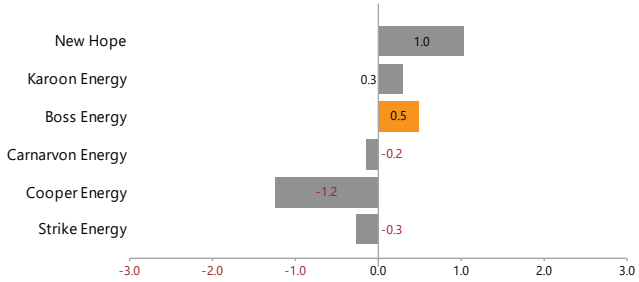
Factors driving the Alpha Model

For the comparable firms this chart shows the key underlying styles and their contribution to the current overall Alpha score.



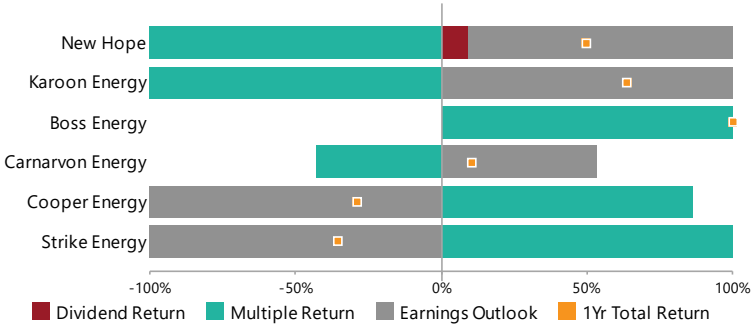
Macquarie Earnings Sentiment Indicator

The Macquarie Sentiment Indicator is an enhanced earnings revisions signal that favours analysts who have more timely and higher conviction revisions. Current score shown below.



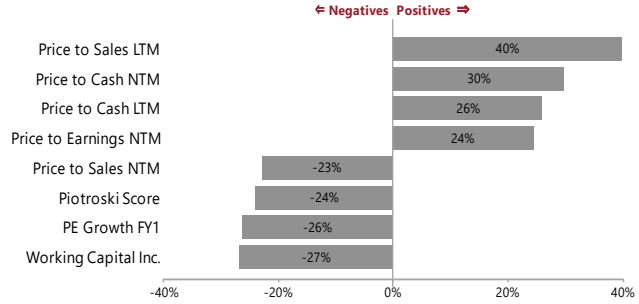
Drivers of Stock Return

Breakdown of 1 year total return (local currency) into returns from dividends, changes in forward earnings estimates and the resulting change in earnings multiple.



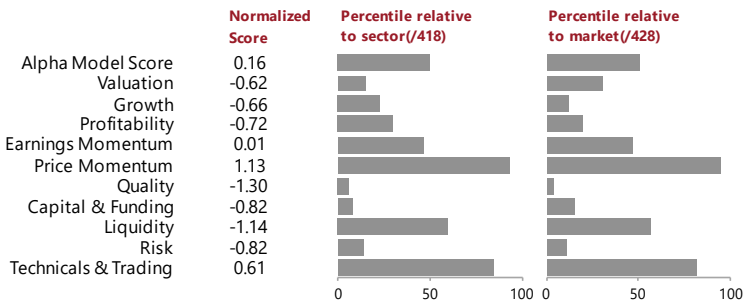
What drove this Company in the last 5 years

Which factor score has had the greatest correlation with the company's returns over the last 5 years.



How it looks on the Alpha model

A more granular view of the underlying style scores that drive the alpha (higher is better) and the percentile rank relative to the sector and market.



Source (all charts): FactSet, Thomson Reuters, and Macquarie Quant. For more details on the Macquarie Alpha model or for more customised analysis and screens, please contact the Macquarie Global Quantitative/Custom Products Group (cpg@macquarie.com)

Important disclosures:

Recommendation definitions

Macquarie – Asia and USA
Outperform – expected return >10%
Neutral – expected return from -10% to +10%
Underperform – expected return <-10%

Macquarie – Australia/New Zealand
Outperform – expected return >10%
Neutral – expected return from 0% to 10%
Underperform – expected return <0%

Note: expected return is reflective of a Medium Volatility stock and should be assumed to adjust proportionately with volatility risk

Volatility index definition*

This is calculated from the volatility of historical price movements.

Very high–highest risk – Stock should be expected to move up or down 60–100% in a year – investors should be aware this stock is highly speculative.

High – stock should be expected to move up or down at least 40–60% in a year – investors should be aware this stock could be speculative.

Medium – stock should be expected to move up or down at least 30–40% in a year.

Low–medium – stock should be expected to move up or down at least 25–30% in a year.

Low – stock should be expected to move up or down at least 15–25% in a year.
* Applicable to select stocks in Asia/Australia/NZ

Recommendations – 12 months
Note: Quant recommendations may differ from Fundamental Analyst recommendations

Financial definitions

All "Adjusted" data items have had the following adjustments made:
Added back: goodwill amortisation, provision for catastrophe reserves, IFRS derivatives & hedging, IFRS impairments & IFRS interest expense
Excluded: non recurring items, asset revals, property revals, appraisal value uplift, preference dividends & minority interests

EPS = adjusted net profit / efpowa*
ROA = adjusted ebit / average total assets
ROA Banks/Insurance = adjusted net profit /average total assets
ROE = adjusted net profit / average shareholders funds
Gross cashflow = adjusted net profit + depreciation
*equivalent fully paid ordinary weighted average number of shares

All Reported numbers for Australian/NZ listed stocks are modelled under IFRS (International Financial Reporting Standards).

Recommendation proportions – For quarter ending 30 Sept 2021

	AU/NZ	Asia	USA	
Outperform	62.76%	67.53%	74.19%	(for global coverage by Macquarie, 4.72% of stocks followed are investment banking clients)
Neutral	31.03%	21.83%	24.73%	(for global coverage by Macquarie, 3.23% of stocks followed are investment banking clients)
Underperform	6.21%	10.64%	1.08%	(for global coverage by Macquarie, 0.00% of stocks followed are investment banking clients)

BOE AU vs Small Ordinaries, & rec history

(all figures in AUD currency unless noted)

Note: Recommendation timeline – if not a continuous line, then there was no Macquarie coverage at the time or there was an embargo period.
Source: FactSet, Macquarie Research, December 2021

12-month target price methodology

BOE AU: A$3.00 based on a 1.0x NAV methodology

Company-specific disclosures:

Important disclosure information regarding the subject companies covered in this report is available publicly at www.macquarie.com/research/disclosures. Clients receiving this report can additionally access previous recommendations (from the year prior to publication of this report) issued by this report's author at https://www.macquarieinsights.com.

Date	Stock Code (BBG code)	Recommendation	Target Price

Target price risk disclosures:
BOE AU: Any inability to compete successfully in their markets may harm the business. This could be a result of many factors which may include geographic mix and introduction of improved products or service offerings by competitors. The results of operations may be materially affected by global economic conditions generally, including conditions in financial markets. The company is exposed to market risks, such as changes in interest rates, foreign exchange rates and input prices. From time to time, the company will enter into transactions, including transactions in derivative instruments, to manage certain of these exposures.

Sensitivity analysis:
Clients receiving this report can request access to a model which allows for further in-depth analysis of the assumptions used, and recommendations made, by the author relating to the subject companies covered. To request access please contact insights@macquarie.com.

Analyst certification:
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