Sprott | Equity Research

11 April 2023

Ticker: IXR AU	**Cash:** A$20m	**Project**: Makuutu
Market cap: A$89m	**Price:** A$0.02/sh	**Country:** Uganda
REC. (unc): BUY	*TARGET (-0.08): A$0.07*	*RISK RATING (unc): HIGH*

In our view, the updated Makuutu DFS plus today's demo plant approval/timeline update accomplishes three key tasks: First, adjusting to lower prices and recovery expectations, it re-scopes the project to manageable 5Mtpa scale that limits capex to US$120m with no further expansions. Second, it leaves room for upside in the form or larger column heights (up to 6m vs the 3m assumed in the DFS) to be confirmed in demo phase 1 and potentially implemented in demo phase 2. This could significantly reduce capex/opex if larger columns show good permeability/recovery/solution tenors. Third, the demo plant should give Ionic product specs at large enough volumes to secure offtake and inform final circuit design decisions. Given lower production volumes, we think a standalone downstream facility is less likely, this is a key step for third party partners and end users.

So what? Ionic has made the strategic adjustments needed given lower prices and lower recoveries – a lower capex project with detailed pilot plant phase to ensure a saleable mixed rare earth carbonated (MREC) product. This preserves upside if prices run hard, which is key in our view, given how China-dominated the supply chain is, especially for heavy rare earths.

Valuation: Updating our DCF valuation for the DFS significantly hits value. At Adamas LT pricing, $NPV_{8\%}$ of US$266m and 27% IRR (using our model) are still attractive vs US$120m initial capex. At SCPe LT US$150/kg NdPr, US$500/t Dy and US$2,200/kg Tb, the economics are less attractive, and even less so at currently depressed spot. Given the strategic value here, we think there is more value here than captured in just the DCF, as indicated by the delta between NPV at spot vs SCPe LT vs Adamas estimates. We therefore amend our valuation to a 50-50% blend of 0.75x$NAV_{8\%}$ and 1% of in-situ value at SCPe LT prices. ***This results in an amended A$0.07/sh price target, and we maintain our Buy rating.*** *At the current share price, we think it's a good opportunity to buy a quality project at the bottom, with i) upside potential from larger columns, 2) the company well funded with A$19m on balance sheet, and 3) geopolitics heating up.*

Update for DFS and pilot plant – we like the lower capex strategy but adjust for lower NPV

Today's pilot plant update: Ionic announced it has received approvals to build and operate the Makuutu Demonstration Plant. Phase I will include a test facility, analytical lab, and test units for heap desorption columns up to 6m height (DFS assumed 3m), nano-filtration and leach solutions. Construction is expected to be completed by late 2Q23. Confirmation of key parameters including heap stack height will precede Stage 2, which includes earthworks, three 5,000t heap desorption leach pads, lined ponds, irrigation pipes, and MREC and impurity precipitation circuits. Phases 1 and 2 are expected to be operational during 4Q23.

Makuutu DFS:

- Inventory: 172.9Mt at 848ppm TREO inventory at 5Mtpa production rate and 35% TREO (excl Ce) recovery resulted in 35-year mine life totaling 40.1kt LOM production of TREO in mixed rare earth concentrate = 1,156tpa LOM average annual production = 1,300tpa in years 1-10.
- REE recoveries: Nd = 33%, Pr = 28%, Dy = 49%, Tb = 45%; TREO excl Ce = 35% overall
- Revenue: at 70% payability for a mixed-rare earth carbonate at Adamas LT pricing = US$3707m LOM = US$21.44/t ore or US$92/kg TREO
- Unit costs: US$2.11/t mined at a 0.57x strip ratio, plus US$7.57/t processed plus US$1.5/t G&A = US$53/kg of product, US$12.4/t of ore or US$61.3m per year. Govt royalties = 5% of revenue. CSR fund = 1% of revenue.
- Scandium byproduct credits: 30ppm head grade = 15tpa production @US$775/kg and 70% payability = US$277m LOM or a US$6.86/kg credit per t of TREO produced.
- Capex: US$121m initial capex and US$19.3m LOM sustaining (US$0.55m/year)

- Economics: US$1.602bn LOM EBITDA (40% EBITDA margin), US$1.023bn LOM FCF, US$278m post tax $NPV_{8\%}$, 32.7% IRR. Adamas price deck used for base case forecast increase from US$57/kg (2021 actuals), US$138.5/kg in 2035.
- Key changes vs the PEA: Removes staged expansions (PEA modelled 2.5Mtpa scaling up to 12.5Mtpa), inventory higher (173Mt at 848ppm and 0.57x strip vs prior 85Mt at 810ppm at 0.76x strip) results in 35-year mine life vs prior 11. Recoveries lowered from 55% TREO excl Ce to 27% plus flat 5Mtpa results in average annual production fall from 2,680tpa to 1,160tpa. Initial capex higher at US$121m for 5Mtpa vs US$89m for 2.5Mtpa but reduces sustaining capital from US$212m over 11 years to US$19m over 35 years.

Our view: DFS and development plant make best of challenging current conditions

First we run through **model changes.** We previously modelled modular 2.5Mtpa expansions reaching a peak of 15Mtpa throughput / 5,100tpa production from 2033. The advantage of that development concept was that it was large enough to anchor a standalone separation facility which we modelled at 7,000tpa of rare earths. The disadvantage was a capital intensive first 8 years where cash flow was continually reinvested into expansions. Revising our model to match the DFS throughput, but with a more gradual ramp up, drops the NPV8% on SCPe like-for-like pricing from US$354m (at 100% ownership, note IXR owns 60%) to US$66m and IRR from 24% to 15%. The main driver was recoveries, which fell from 55% TREO (excl Ce) to 27%, otherwise we think the flat 5Mtpa would likely have driven similar IRR if not similar NPV to the prior.

On **downstream** we revise our assumptions of a 100% owned standalone facility to 50% ownership of a 5ktpa facility. We model 2029 separation startup (previously 2026) and US$200m capex for 5ktpa of separation capacity (previously US$200m for 7ktpa). This results in US$139m NPV for IXR's assumed 50% vs prior US$421m for 100%.

Next **our thoughts on the DFS**: As mentioned, lower recoveries are negative, but given the testwork results, we think Ionic did well to acknowledge the reality and scope of a more capital efficient project in response. The cost inputs appear robust – US$2.11/t mined for free dig near surface material is reasonable, US$7.57/t processed was higher than our prior estimate, though US$1.50/t G&A may be on the low end depending on accommodation arrangements. In our view, sustaining capital is the input that could see a future increase as it works out to US$0.55m/year, but US$60-65m overall operating cost per year is similar to a ~18Mtpa slurry mineral sands operation and backfill costs are contained in opex.

Finally, on **today's pilot plant announcement**, despite the current challenging price environment, we think it makes sense to proceed with the pilot plant, as it will enable Ionic to maintain first mover status and be the first to benefit, should rare earth prices or heavy rare earth prices run hard, presumably from a geopolitical shock or Chinese export quota reduction. Stage I of the pilot should enable Ionic to work out heap size, leach dynamics (tenors, agglomeration, etc) and impurity management, which then enables it to implement it at scale in Stage 2. The potential game changer here would be if greater stack heights test well – that would enable a smaller heap footprint, thus either capex and opex savings.

Big picture view: Still like company and commodity, but optionality more important now

Ultimately, we think being a near-production source of heavy rare earths is something we want exposure to – it's almost a pure play trade on US-China bifurcation, with resource where supply is China-dominated. In our view current prices are a reflection of the domestic Chinese supply-demand dynamic and increased quotas, however if the West is to diversify supply, deposits like Makuutu and AR3's Koppamurra will have to enter production. The key here is to preserve the capital structure and advance the project to take advantage of a price adjustment, and we think Ionic is well positioned with A$19m cash, and the demonstration plant stages 1 and 2 in 2023.

Why we like Ionic

- The largest ionic clay deposit available to directly supply HREEs to Western end users
- Able to get into production by SCPe 2025
- Excellent infrastructure including highway, hydropower and reagents
- Opportunity to become an integrated upstream and midstream supplier

Catalysts

- 2023: SCPe pilot plant, trial mining
- 2024: SCPe first production and ramp up
- 2025: SCPe steady state production

Research

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Ticker:	IXR AU	**Price / mkt cap:**	A$0.02/sh, A$89m	**Market P/NAV:**	0.16x	**Assets:**	Makuutu
Author:	J Chan / E Magdzinski	**Rec / PT:**	BUY / A$0.07	**1xNAV FD:**	A$0.10/sh	**Country:**	Uganda

Group-level SOTP valuation	4Q22	1Q23			
		US$m	**O/ship**	**NAVx**	**A$/sh**
Makuutu (60%) NPV 1Q23		40	60%	0.75x	0.01
Makuutu (1.5% insitu value at SCPe LT prices)		364	60%	0.75x	0.09
Makuutu valuation (50-50% DCF+ insitu value)		**202**	**60%**	**0.75x**	**0.05**
Downstream		139	100%	0.75x	0.04
Central SG&A & fin costs 1Q23		(74)	-	0.75x	(0.02)
Cash and restr. cash 4Q22		14	-	0.75x	0.00
Cash from options		6	-	0.75x	0.00
Debt 4Q22		-	-	0.75x	-
1xNAV8% spot fully diluted, pre-funded		**286**			**0.07**
Assumed equity raised		60		0.75x	0.01
1xNAV8% spot fully funded		**346**			**0.07**

1x fully funded NAVPS sensitivity to gold price and discount / NAV multiple					
Valuation (A$/sh)	$100/kg	$125/kg	$150/kg	$175/kg	$200/kg
0.50xNAV	0.03	0.04	0.04	0.05	0.06
0.60xNAV	0.04	0.05	0.05	0.06	0.07
0.75xNAV	0.05	0.06	0.07	0.08	0.08
1.00xNAV	0.06	0.08	0.09	0.10	0.11
Makuutu NPV8% (US$m)	$100/kg	$125/kg	$150/kg	$175/kg	$200/kg
12% discount	(21)	(4)	13	30	47
10% discount	(16)	5	25	45	65
8% discount	(9)	15	40	64	89
5% discount	3	39	73	108	143

Makuutu 1xNAV sensitivity to recovery and payability					
Makuutu NPV8% (US$m)	Recov: 20.0%	25.0%	27.0%	30.0%	35.0%
Payability: 60%	-1	-12	-15	-17	-19
Payability: 70%	63	44	40	36	34
Payability: 80%	121	98	93	88	86
Payability: 90%	178	152	147	141	137
Payability: 100%	235	206	200	193	189

Valuation over time	**Jun '22**	**Jun '23**	**Jun '24**	**Jun '25**	**Jun '26**
Makuutu NPV (US$m)	37.0	40.6	83.7	129.7	131.6
Downstream	121.0	130.7	141.2	152.5	164.7
Exploration and in-situ tonnes	363.8	363.8	363.8	363.8	363.8
Cntrl G&A & fin costs (US$m)	(72.9)	(75.0)	(81.1)	(62.4)	(60.8)
Net cash at 1Q (A$m)	13.8	105.2	90.2	5.5	8.4
1xNAV (US$m)	463	565	598	589	608
P/NAV (x):	0.11x	0.12x	0.14x	0.14x	0.13x
1xNAV share px FD (A$/sh)	0.20	0.18	0.17	0.17	0.17
ROI to equity holder (% pa)	*772%*	*184%*	*94%*	*64%*	*49%*

Sources and uses of cash			
SCPe evaluation costs	A$10m	SCPe current cash + options	A$28m
SCPe capex (US$121m @ 60%)	A$103m	Debt package	A$102m
SCPe contingency	A$70m	Equity Raised	A$74m
SCPe G&A + fin. cost to prodn	A$16m		
SCPe working capital	A$5m		
Total uses	A$204m	Total proceeds	A$204m

Production (100%)	**Jun '24**	**Jun '25**	**Jun '26**	**Jun '27**	**Jun '28**
Makuutu (t REE)	--	281	1,244	1,635	1,547
Makuutu (t Nd+Pr)	--	50	196	437	414
Makuutu (t Dy)	--	5	31	65	64
Makuutu (t Tb)	--	1	5	10	10
Makuutu revenue (US$/kg REE)	--	62	62	71	72
Makuutu cash cost (US$/kg REE)	--	59	45	38	40
Makuutu AISC (US$/REE)	--	82	70	55	57
Refinery (TREO produced)	--	--	--	--	--
Refinery (t Nd+Pr)	--	--	--	--	--
Refinery (t Dy)	--	--	--	--	--
Refinery (t Tb)	--	--	--	--	--
Refinery share of Makuutu feed (%)	--	--	--	--	--
Refinery EBITDA margin (%)	--	--	--	--	--
Refinery revenue (US$/kg REO)	--	--	--	--	--

Resource / Reserve	**Mt**	**ppm TREO**	**000t REO**	**$m insitu**	**EV/insitu**
Measured, ind. & inf.	532	640	340	21,656	0.23%
SCPe Mine Inventory	173	856	148	6,024	0.83%
Commodity price	**Jun '22**	**Jun '23**	**Jun '24**	**Jun '25**	**Jun '26**
NdPr price (US$/t)	143	113	150	150	150
Share data					
Basic shares (m): 3872.6	FD + options (m):	4,085.1		FD/FF	5,568.3
Ratio analysis	**Jun '22**	**Jun '23**	**Jun '24**	**Jun '25**	**Jun '26**
FD shares out (m)	3,873	5,356	5,356	5,356	5,356
EPS (US$/sh)	(0.00)	(0.00)	(0.00)	(0.00)	0.00
CFPS before w/c (US$/sh)	(0.00)	(0.00)	0.00	(0.01)	0.00
FCFPS pre growth (US$/sh)	0.00	(0.00)	0.01	0.00	0.00
FCF/sh (US$/sh)	(0.00)	(0.00)	(0.01)	(0.02)	0.00
FCF yield pre growth (US$/sh)	3%	(4%)	28%	1%	2%
FCF yield (%)	(14%)	(5%)	(42%)	(69%)	2%
EBITDA margin (%)	-	-	-	(34%)	15%
FCF margin (%)	--	--	--	(573%)	4%
ROA (%)	(9%)	(4%)	(5%)	(7%)	0%
ROE (%)	(10%)	(4%)	(10%)	(13%)	0%
ROCE (%)	(10%)	(4%)	(2%)	(3%)	3%
PER (x)	(17x)	(21x)	(10x)	(9x)	405x
P/CF (x)	(27x)	(25x)	(10x)	(9x)	33x
EV/EBITDA (x)	(14x)	(4x)	(7x)	(23x)	11x
Income statement	**Jun '22**	**Jun '23**	**Jun '24**	**Jun '25**	**Jun '26**
Revenue (US$m)	--	--	--	15	66
COGS (US$m)	--	--	--	(15)	(51)
Gross profit (US$m)	**--**	**--**	**--**	**(0)**	**15**
Expenses (US$m)	(3)	(4)	(1)	(2)	(5)
Impairment & other (US$m)	--	--	--	--	--
Net finance costs (US$m)	0	--	(7)	(8)	(3)
Tax (US$m)	--	--	--	--	(3)
Minority interest (US$m)	--	--	--	--	--
Net income attr. (US$m)	**(3)**	**(4)**	**(9)**	**(11)**	**4**
EBITDA (US$m)	*(5)*	*(5)*	*(5)*	*(5)*	*10*
Cash flow	**Jun '22**	**Jun '23**	**Jun '24**	**Jun '25**	**Jun '26**
Profit/(loss) after tax (US$m)	(5)	(5)	(12)	(14)	0
Add non-cash items (US$m)	1	--	--	1	3
Less wkg cap / other (US$m)	(0)	--	12	(20)	(0)
Cash flow ops (US$m)	**(4)**	**(5)**	**0**	**(33)**	**3**
PP&E (US$m)	--	(1)	(52)	(51)	(0)
Other (US$m)	(2)	(1)	--	--	--
Cash flow inv. (US$m)	**(11)**	**(1)**	**(52)**	**(51)**	**(0)**
Debt draw (repayment) (US$m)	--	--	102	--	--
Equity issuance (US$m)	30	85	7	--	--
Other (US$m)	--	--	--	--	--
Cash flow fin. (US$m)	**30**	**85**	**109**	**--**	**--**
Net change post forex (US$m)	16	78	57	(85)	3
FCF (US$m)	*(13)*	*(6)*	*(52)*	*(85)*	*3*
Balance sheet	**Jun '22**	**Jun '23**	**Jun '24**	**Jun '25**	**Jun '26**
Cash (US$m)	27	105	162	77	80
Accounts receivable (US$m)	1	1	1	6	8
Inventories (US$m)	--	--	--	6	6
PPE & exploration (US$m)	13	14	66	117	114
Other (US$m)	9	9	9	9	9
Total assets (US$m)	**49**	**129**	**238**	**215**	**218**
Debt (US$m)	--	--	102	102	102
Other liabilities (US$m)	1	1	13	4	6
Shareholders equity (US$m)	77	162	169	169	169
Retained earnings (US$m)	(29)	(34)	(46)	(60)	(60)
Minority int. & other (US$m)	--	--	--	--	--
Liabilities+equity (US$m)	**49**	**129**	**238**	**215**	**218**
Net cash (US$m)	*27*	*105*	*60*	*(24)*	*(21)*
Net debt to NTM EBITDA (x)	*5.4x*	*21.0x*	*11.9x*	*2.4x*	*0.6x*

Source: SCP estimates

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