

ASX Release

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SCOPING STUDY DEMONSTRATES FEASIBILITY OF ASM KOREAN METALS PLANT

Highlights:

- Initial 5,200tpa Korean Metals Plant study delivers strong economics
 - Estimated capital – approximately US\$35-45 million
 - Estimated annual revenue – approximately US\$180m-190m
 - Estimated annual EBITDA – approximately US\$45m-\$50m
- Expenditure of US\$ 1.5m on detailed engineering approved by ASM Board & underway
- A final investment decision (FID) on the 5,200tpa Korean Metal Plant expected in mid-2021
- Plans to expand the 5,200tpa Metal Plant to over 16,000tpa by 2024
- Commercial production of Titanium and NdFeB metal powder from ASM's existing Korean commercial pilot plant proposed to commence in Q2 2021

Australian Strategic Materials (ASX: ASM) (**ASM**) has completed an internal Scoping Study for an initial 5,200tpa metals plant (**Korean Metals Plant** or **KMP**) in Korea. The results of the study demonstrate the feasibility of the Korean Metals Plant.

As a result of the positive outcome of the Scoping Study, the ASM Board has approved an expenditure of approximately US\$1.5 million for detailed design engineering. This will provide a fully engineered scope of works and further refine capital estimates, before making a final investment decision by June 2021. The Korean Metals Plant will initially produce high-purity neodymium iron boron powder and titanium powder using the innovative, low-energy metallisation process developed and patented by ASM's Ziron Tech team.

Cautionary Statements

The Scoping Study referred to in this announcement is a preliminary technical and economic study of the potential viability of the Korea Metal Plant, and is insufficient to provide definitive assurance of an economic development case, or to provide certainty that the conclusions of the Scoping Study will be realised. It has not been externally verified or calculated and is based upon public information and internally developed data, and reflects prevailing conditions and views as of the date of this announcement, all of which are accordingly subject to change.

The Scoping Study is based on the material assumptions outlined below. These include assumptions about the availability of funding. While ASM considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Scoping Study will be achieved.

To achieve the range of outcomes indicated in the Scoping Study, funding in the order of US \$35 to US \$45 million will likely be required. Investors should note that there is no certainty that ASM will be able to raise that amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of ASM's existing shares.

Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Scoping Study.

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With the completion of the detailed engineering and the confirmation of the capital costs of the KMP, an investment decision is anticipated by June 2021. Construction of the Korean Metals Plant is expected to be completed by mid-2022, with metal production to progressively increase, expecting to reach full capacity of 5,200tpa by mid-2022.

ASM will continue to pursue its collaborative strategy with Korean manufacturers to independently produce key critical metals, focusing on rare earths, titanium and zirconium metals, alloys, and powders. ASM expects to expand the capacity of the KMP to over 16,000tpa by the end of 2024, to meet the potential Korean demand.

ASM Managing Director, David Woodall, said: “Our ability to commercially produce high-purity critical metals for advanced technology manufacturers in Korea gives ASM an excellent foundation to be an independent fully integrated critical metals producer globally. With the US\$ 4.5 million grant in 2020 from the Korean Government and the excellent work and milestones delivered by our Ziron Tech team, we are confident about our strategy to integrate into Korea’s critical metals sector.”

“Korea is phase one. Once complete, this will provide the template for future ASM metals plants in other regions. We’ll now continue to progress our ‘mine to manufacturer’ strategy using our pilot plant furnaces in the second half of 2021, with the production of titanium and rare earth permanent magnet alloy powders. This will enable ASM to commence providing critical metals directly into the Korean manufacturing sector.”

The Scoping Study demonstrates the potential for the KMP to deliver a profitable standalone downstream business for ASM while the company progresses the Dubbo Project. ASM’s KMP will supply high-purity products direct to the Korean market, providing manufacturers with a stable and secure domestic supply of metals. ASM will continue discussions and negotiations for offtake contracts to grow its customer base and market presence.

BACKGROUND

The development of an innovative, low-energy metallisation process led to the establishment of Ziron Tech and the commencement of laboratory testing and refining. Part of this process included the successful conversion of all the oxides that will be sourced from the proposed development of ASM's Dubbo Project into high-value critical metals. Collaboratively funded by ASM and a US\$4.5m Korean Government grant, Ziron Tech constructed a pilot plant where commercial production of the high-purity critical metals was confirmed.

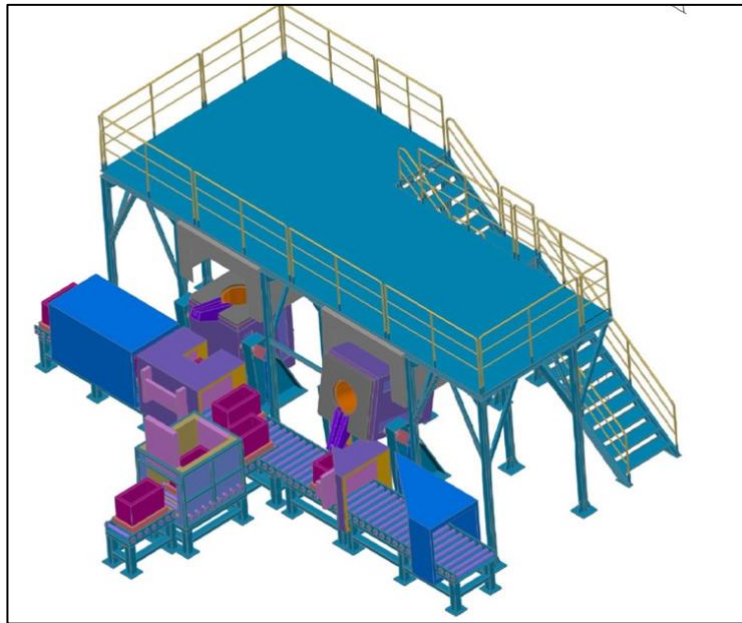


Figure 1 - 3D Conceptual Design of Titanium Reduction Furnance

The pilot plant test work has successfully confirmed the production of the following metals and alloys (see various ASX announcements over the past six months):

- High-purity titanium (99.9%) and titanium metal powder (99.83%)
- High-purity neodymium metal (99.8%)
- High-purity praseodymium metal (99.3%)
- High-purity NdPr alloy (99.65%)
- High-purity dysprosium (99.53%)
- High-purity zirconium metal powder (98% zirconium, 1.5% hafnium)
- High-purity ferro-neodymium alloy
- Neodymium iron boron (NdFeB) alloy, for which KIRAM certified the metallic structure for the production of a NdFeB permanent magnet alloy

The pilot plant test work also facilitated process improvements and refinements, which significantly improved the production efficiency in terms of metals yield and power consumption, and are now patented.

A continuous flow test in November 2020 produced a TiCu alloy at a rate equivalent to 1,000kg/day using the pilot plant, confirming the commerciality of the innovative metallisation process. The commercial confirmation, with improved efficiency in power

usage and metal yield, were the key aspects that have enabled ASM to commence the detailed design engineering as it progresses its first commercial metal plant in Korea.

SCOPING STUDY OVERVIEW

ASM proposes to initially construct a 5,200tpa plant to produce high-purity critical metals. Once fully commissioned, the 5,200tpa plant will have the flexibility to add production to meet increasing Korean demand and customer offtake specifications for the various products. This would see the initial plant incrementally expanded to a capacity of over 16,000tpa by 2024. The following tables summarise the key elements of the KMP Scoping Study.

Scoping Study Summary	
Construction Commencement	Q3 2021
Construction Completion	Q2 2022 (staged commissioning from Q1 2022)
First Production	Q3 2022
Initial Capacity	5,200tpa
Expanded Capacity	+ 16,000tpa
Total Employees	130 (includes Korean corporate and R&D offices)

Table 1 - KMP Scoping Study Summary

Products Produced	2021	2022	2023	2024	2025	2026
Ti metal	0 t	200 t	1,500 t	2,000 t	2,500 t	2,500 t
Ni Ti alloy	0 t	190 t	240 t	240 t	250 t	250 t
Cu Ti alloy	0 t	190 t	240 t	240 t	250 t	250 t
Ti Powder	1,550 t	2,500 t	2,500 t	3,500 t	5,000t	5,000 t
NdFeB powder	70 t	2,500 t	3,440 t	3,440 t	6,250 t	6,250 t
Dy metal	0 t	20 t	30 t	30 t	100 t	100 t
Zr metal	0 t	0 t	450t	450 t	450 t	450 t
Total Saleable Production	1,590 t	5,600 t	8,600 t	9,700 t	14,500 t	14,500 t
Total Plant Production²	1,620 t	6,400 t¹	9,500 t	11,000 t	16,800t	16,800 t

Table 2 - Production Summary (Note: 1 inclusive of preproduction metal from the pilot plant 2, Total Plant Production includes Nd produced but consumed in the production on NdFeB)

Financial Summary	2021	2022	2023	2024	2025	2026
	US\$ M	US\$ M	US\$ M	US\$ M	US\$ M	US\$ M
Capital Costs & Sustaining Capex	44	18	18	2	2	4
Revenue	34	188	290	320	520	520
Operating Costs	17	140	220	240	400	400
EBITDA	17	48	70	80	120	120
Ziron Tech Founders Royalty	1.0	2.0	2.5	3.0	4.0	4.0
Depreciation	0.0	9	12	12	12	12
Tax (Korean Tax @ 25%)	4	7	11	13	23	23
NPAT	11	40	56	66	93	93
Payback	~1.0 years					

Table 3 - Financial Summary (Note: numbers rounded for presentation)

Metal Price Assumptions	Spot Prices US\$ /kg	Low Prices US\$ /kg	High Prices US\$ /kg
Ti metal	15.00	10.00	17.50
Ni Ti alloy	45.00	35.00	55.00
Cu Ti alloy	25.00	15.00	35.00
Ti Powder	20.00	15.00	25.00
Nd metal	110.00	90.00	130.00
NdFeB Powder	45.00	40.00	50.00
Dy metal	460.00	410.00	510.00
Zr metal	75.00	50.00	100.00

Table 4 - Metal Price Assumptions (Source: Argus International and Adamas Intelligence February 2021)

Capital Cost Estimate

The metal plant capital cost estimate has been completed based on the construction and successful operation of the Ziron Tech pilot plant facility. The capital estimates include the supply and installation of major equipment (such as the number of furnaces), based on the metal recovery efficiencies demonstrated in the test programs that were sourced in Korea by the Ziron Tech team. All capital estimates are within +/- 30% accuracy/margin of error and will be further refined and updated during the detailed engineering phase that will be completed by a Korean engineering, procurement, and construction (EPC) contractor. The sensitivity of the capital cost for the proposed KMP is summarised in Appendix 1.

The capital cost estimate also includes costs for site preparation, concrete, structural and associated works, electrical power supply, emergency power supply, water supply, sewage treatment, fire protection, and ancillary facilities.

Korean Plant Capital Cost Estimate (US\$m)		
Office and Plant		5.8
Direct Equipment Cost		19.3
Indirect Costs	26%	6.5
Detailed Engineering	5%	1.5
Owners Costs	3%	0.8
Contingency	30%	9.7
Total Korean Plant Capital Estimate		43.6

Table 5 - Capital Estimate (source Ziron Tech 2020)

Indirect capital costs and allowances were estimated as 26% of the direct costs of the plant and include temporary facilities and services, site offices, vendor costs, freight, and material management, first fills and spares, insurance, and EPC costs. An allowance of 5% of the direct equipment cost was used to estimate the detailed engineering cost of the facility.

The generalised plant layout was completed by Dongkuk Refractories and Steel Co (DK R&S) as part of a previous agreement with ASM (ASX Announcement 2 November 2020). These 3D layouts were used to estimate the size and cost of the facility, and to estimate the civil, concreting, and structural works. A contingency of 30% was applied to the direct and

indirect cost estimates for process plant and infrastructure which is consistent for a study at this stage of development.

ASM is progressing tenders from several EPC providers, including DK R&S, for detailed engineering of the 5,200tpa metal plant, with the following milestones summarised in Table 6 below:

Korean Metal Plant Milestones		Date Due:
Detailed Engineering		Q2 2021
Board Approval to Commence Construction		End of Q2 2021
EPC Contract Award		Q3 2021
Construction – Commence		Q3 2021
Construction – Complete		End Q2 2022
Full Production		Q3 2022

Table 6 - Project Milestones

Operating Cost Estimate

Operating cost estimates are within +/- 20% accuracy/margin of error based on the actual cost of production from six months of operating the pilot plant facility with the various metals produced at the plant in Korea. The general and administrative costs include site services, power services, environmental, permitting, safety, contingency, Daejeon office, security, management, water treatment, sewage treatment, infrastructure support, water supply, and plant technology. Given the low volumes of raw material required for the KMP, transport costs have an immaterial impact on total operating costs (~less than .05% of total operating costs).

Labour Cost

The labour component of the operating cost estimates is based on the number of people required to accommodate the metal facility, including the Korean corporate office and administration staff. It is estimated that the Korean organisation to support the 5,200-tonne plant will be 130 people inclusive of the Korean corporate, research, and development team and plant operating labour. Labour costs are inclusive of the base salaries from Ziron Tech with a 35% on-cost factor applied.

Consumables Costs and Sourcing

The consumables component included in the operating cost estimate is based on the efficiency of production of titanium, titanium alloy, titanium powder, neodymium, neodymium/praseodymium, and dysprosium through the pilot plant. The prices of the oxide materials are based on China FOB price (not including discounts for the rare earth oxides), and other prices as published by Argus International. The quantities and prices of the various materials used in the production of these metals, inclusive of transport costs, are the basis of the consumable costs. All consumable costs are based on over six months of the successful operation of the commercial pilot plant and are inclusive of the delivery of the consumables to the planned KMP in Korea.

The raw material inputs will be sourced from established globally traded markets with the quantities required for the plant anticipated to be readily available to the Company. The supply of the raw materials is anticipated to be from existing producers and holders of inventory with whom the Company has already established a supply relationship with during the operation of the pilot plant over the previous 7 months. The Scoping Study has been prepared on the basis of a standalone downstream business, and does not assume availability of raw material inputs from the Company's Dubbo Project. In the event that the Dubbo Project is developed and begins to produce raw materials suitable for the KMP, the Company will review supply arrangements to ensure the best outcome for shareholders.

Transport.

The KMP is expected to be located in an established industrial zone within Korea with excellent existing transport and power infrastructure. Four locations have been identified with the preferred being a large well established site already supporting global consumer goods manufacturers (e.g. Samsung, SK Hynix, LG Chemicals, Hyundai). Transport of raw material will be via a combination of sea, rail and road. The low volume of raw material required is able to be easily accommodated within existing capacity of each transport means.

Power Cost

The power cost component included in the operating cost estimates is based on the power charges purchased from a Korean energy supplier, with the consumption rates taken from the actual measurements during the production of metals in the pilot plant.

Scoping Study Sensitivity

A sensitivity analysis has been completed on the proposed KMP using the price assumption as detailed in Table 4, oxide price assumption as detailed in Table 8 in Appendix 1 with capital and operating costs having a factor of +10% and +20% applied.

Price Assumptions	Spot Prices US\$	Low Prices US\$	High Prices US\$
TiO₂	2.00	1.50	2.50
Ni metal	6.80/lb	4.00 /lb	9.00 /lb
Cu metal	4.0/lb	3.0/lb	5.00/lb
Nd₂O₃	90.00	75.00	105.00
Dy₂O₃	375.00	300.00	450.00
ZrO₂	30.00	20.00	40.00

Table 7 - Price Assumptions (Source Argus International and Internal References February 2021)

The summary of the sensitivity analysis is shown in Appendix 1.

Funding

Construction of the Korean Metals Plant is contingent on securing funding that maximises the return to all shareholders. It is most likely that financing would be undertaken via a combination of debt and equity, and may include Korean and local government financing and incentives.

Based on the scoping study, with ASM's current market capitalisation, and discussions with third parties to date there are reasonable grounds to believe that the Korean Metals Plant can be financed for development.

NEXT STEPS

The ASM Board has approved proceeding with detailed engineering to define the scope of works for construction of the KMP (using independent engineering firms to global industry standards) and to confirm the capital estimate in the KMP Scoping Study. The costs associated with this external engineering study are expected to be approximately US\$1.5 million. ASM expects the completion of this engineering work, together with offtake and financing discussions over the next several months, will lead to a development decision at the end of Q2 2021.

While this engineering work progresses, ASM will commence commercial production of approximately 200 tonnes of titanium powder and 8 tonnes of NdFeB strip metal alloy using the two reduction furnaces at its existing commercial pilot plant as it progresses the 5,200tpa Metal Plant to full-scale metal production in 2022. The company will continue discussions with oxide suppliers and Korean metal and alloy consumers, ensuring key supply and offtake contracts are delivered before the development decision for the KMP. ASM expects to secure offtake contracts for the majority of revenue categories before a decision to proceed with construction.

IMPORTANT INFORMATION

Forward-looking Statements

This release contains 'looking information' that is based on ASM's expectations, estimates and projections as of the date on which the statements were made. This forward looking information includes, among other things, statements with respect to studies, ASM's business strategy, plan, development, objectives, performance, outlook, growth, cash flow projections, targets and expectations. Generally, this forward-looking information can be identified by the use of forward-looking terminology such as 'outlook', 'anticipate', 'project', 'target', 'likely', 'believe', 'estimate', 'expect', 'intend', 'may', 'would', 'could', 'should', 'scheduled', 'will', 'plan', 'forecast', 'evolve', and similar expressions. Persons reading this announcement are cautioned that such statements are only predictions, and that ASM's actual future results or performance may be materially different. Forward-looking information is subject to known and unknown risks, uncertainties and other factors that may cause ASM's actual results, level of activity, performance, or achievements to be materially different from those expressed or implied by such forward looking information.

Forward looking information is developed based on assumptions about such risks, uncertainties and other factors set out in this announcement, including but not limited to general business, economic, political and social uncertainties; the actual results of current development activities; conclusions of economic evaluations; changes in project parameters as plans continue to be refined; future prices of metals; failure of plant, equipment or processes to operate as anticipated; accident, labour disputes and other risks of the mining industry; and delays in obtaining government approvals or financing or in the completion of development or construction activities. This list is not exhaustive of the factors that may affect our forward-looking information. These and other factors should be considered carefully, and readers should not place undue reliance on forward-looking information.

Neither ASM, nor any other person, gives any representation, warranty, assurance or guarantee that the occurrence of the events expressed or implied in any forward-looking statement will actually occur. Except as required by law, and only to the extent so required, none of ASM, its subsidiaries or its directors, officers, employees, advisors or agents or any other person will in any way be liable to any person or body for any loss, claim, demand, damages, costs or expenses of whatever nature arising in any way out of, or in connection with, the information contained in this announcement. ASM disclaims any intent or obligation to revise any forward-looking statement whether as a result of new information, estimates or options, future events or results or otherwise, unless required to do so by law.

Advice

Nothing in this announcement constitutes investment, legal or other advice. Investors should make their own independent investigation and assessment of ASM and obtain any professional advice required before making any investment decision based on your investment objectives and financial circumstances.

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This document has been authorised for release to the market by David Woodall, Managing Director.

About Australian Strategic Materials – www.asm-au.com

Australian Strategic Materials Ltd (ASM) is an integrated materials business and emerging “mine to manufacturer” producer of [critical metals](#). The company’s cornerstone [Dubbo Project](#) (100% owned) is a proven long-term resource of [rare earths](#), [zirconium](#), [niobium](#), and [hafnium](#) located in central-western NSW, Australia. It represents an alternative, sustainable and secure source of these metals, which are critical for a diverse range of advanced and clean technologies.

ASM’s metals business is founded on a novel [metallisation process](#) that converts oxides into high-purity metals, alloys, and powders using less energy than conventional methods. The pilot plant in South Korea has proven the commercial scalability of the process and successfully produced a range of high-purity metals and alloys, including titanium, neodymium, praseodymium, dysprosium, and zirconium. Following this success, ASM’s first metallisation plant will be constructed in South Korea to supply a range of critical metals including rare earths, zirconium, and titanium.

A Dubbo Project optimisation study will be completed by the end of Q1 2021, targeting improved capital and operating costs, along with an increased revenue stream. Elements of this optimisation study include simplifying the flowsheet, increasing recoveries of rare earths, and potentially including a front-end flotation circuit.

Appendix 1 (February 2021)

Table 8 - Korean Metal Plant Sensitivity Analysis

Metal Price Assumptions	Spot Prices US\$ /kg	Low Prices US\$ /kg	High Prices US\$ /kg
Ti metal	15.00	10.00	17.50
Ni Ti alloy	45.00	35.00	55.00
Cu Ti alloy	25.00	15.00	35.00
Ti Powder	20.00	15.00	25.00
Nd metal	110.00	90.00	130.00
NdFeB Powder	45.00	40.00	50.00
Dy metal	1,750.00	1,400.00	2,100.00
Zr metal	75.00	50.00	100.00
Price Assumptions	Spot Prices US\$	Low Prices US\$	High Prices US\$
TiO₂	2.00	1.50	2.50
Ni metal	6.80/lb	4.00 /lb	9.00 /lb
Cu metal	4.0/lb	3.0/lb	5.00/lb
Nd₂O₃	90.00	75.00	105.00
Dy₂O₃	375.00	300.00	450.00
ZrO₂	30.00	20.00	40.00
Sensitivity – Korean Metal Plant	Spot Prices US\$	Low Prices US\$	High Prices US\$
Estimated Operating Costs			
Average Revenue	\$ 188 million	\$ 157 million	\$ 216 million
Average EBITDA	\$ 48 million	\$ 38 million	\$ 58 million
Base + 10% Operating Costs			
Average Revenue	\$ 188 million	\$ 157 million	\$ 216 million
Average EBITDA	\$ 34 million	\$ 26 million	\$ 42 million
Base + 20% Operating Costs			
Average Revenue	\$ 188 million	\$ 157 million	\$ 216 million
Average EBITDA	\$ 20 million	\$ 14 million	\$ 25 million

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