

SciDev Ltd (ASX:SDV)

<i>Listed shares:</i>	<i>107.263 million ord fp shares</i>
<i>Employee options:</i>	<i>9.300 million, strike prices 10¢ to 25¢</i>
<i>Share price:</i>	<i>26¢ as at 5 August 2019</i>
<i>Diluted market cap:</i>	<i>\$30m</i>

Substantial gains possible

- Operating within the murky waters of the global water clarification chemicals industry, SciDev is a minnow in a sea of well-fed sharks.
 - The company's Optiflox® technology (patents pending) helps regulate dosage rates of the chemicals to save on costs and improve process plant efficiencies, thus providing a competitive advantage. But the system did not gain sufficient traction under previous management.
 - After many years of underperformance, in recent months SDV has been revitalised with new management armed with good industry credentials, who have been attracted to the company on the basis of its technology and who have invested in the stock accordingly. Their present focus is on the mining and oil industries and their belief is that they can better the giants who dominate the supply of chemicals to those industries.
 - Strategic alliances have been formed with other chemical industry participants and suddenly revenue is starting to accelerate. Substantial sales contracts are in the offing which if secured would lead to profits that look substantial against the company's puny market capitalisation.
 - The improvement won't save SciDev from making a loss in FY19 but based on the scenario that I have adopted in the report:
 - EPS for the next three years would be 0.9¢, 2.4¢ and 3.8¢.
 - Return on equity in those years would be 14%, 28% and 33%.
 - My central valuation is 71¢ within a wide range of probabilities.
 - But I would caution that this is just one scenario. The reality could be very different, either way.
 - At the risk of stating the obvious, the key to short term performance in the stock will be whether substantial sales contracts can be secured.
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SciDev Ltd (SDV)

Share price 26.0¢, issued shares 107.3 mill, mkt cap \$27.9m

June years	18a	19e	20e	21e	22e	23e
Profitability (\$m)						
Sales revenue	2.0	3.0	15.0	25.0	33.0	41.3
Cost of sales	1.3	2.0	11.0	18.8	24.8	30.9
Gross profit	0.8	1.0	4.1	6.3	8.3	10.3
Margin	38%	34%	27%	25%	25%	25%
Interest income	0.0	0.0	0.0	0.0	0.0	0.1
Other income	0.5	0.5	0.3	0.3	0.3	0.3
General expenses	2.1	2.9	3.2	3.6	3.9	4.4
EBITDA	-0.8	-1.4	1.2	3.0	4.7	6.3
Cost of finance/oj	0.0	0.0	0.0	0.0	0.0	0.0
Depn/Impair/etc	1.8	-0.2	-0.2	-0.2	-0.2	-0.3
Pretax profit	1.0	-1.6	1.0	2.8	4.5	6.1
Income tax	0.0	0.0	0.0	0.0	0.0	0.0
Net profit	1.0	-1.6	1.0	2.8	4.5	6.1
EPS (c)	0.0	-1.5	0.9	2.4	3.8	5.1
EPS (c) fully dilute	0.0	-1.3	0.9	2.4	3.8	5.0
DPS(c) declared fc	0.0	0.0	0.0	0.0	0.0	0.0
Cash flow (\$m)						
From operating activities						
Sales receipts	2.3	2.8	11.9	23.6	31.3	39.5
Paymtns to supplie	-3.5	-4.8	-13.8	-22.9	-28.7	-35.3
Other	0.3	0.4	0.0	0.0	0.0	0.1
Total	-0.9	-1.6	-1.9	0.7	2.7	4.3
From investing activities						
Capex	-0.1	-0.2	-0.2	-0.2	-0.2	-0.2
Other	0.2	0.3	0.0	0.0	0.0	0.0
Total	0.1	0.1	-0.2	-0.2	-0.2	-0.2
From funding activities						
Debt	0.0	0.0	0.0	0.0	0.0	0.0
Equity	0.4	2.9	2.2	0.0	0.0	0.6
Divs, capital retu	0.0	-0.2	0.0	0.0	0.0	0.0
Total	0.4	2.7	2.1	0.0	0.0	0.6
Cash position						
Change from abov	-0.4	1.2	0.0	0.5	2.5	4.6
Forex movements	0.0	0.0	0.0	0.0	0.0	0.0
Closing	0.6	1.8	1.8	2.2	4.7	9.4
Balance sheet (\$m)						
Current assets						
Cash	0.6	1.8	1.8	2.2	4.7	9.4
Receivables	0.7	1.1	4.5	6.3	8.3	10.3
Inventories	0.2	0.4	2.2	3.8	5.0	6.2
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total	1.5	3.2	8.5	12.2	17.9	25.9
Non-current assets						
Plant & equipmer	0.3	0.3	0.3	0.4	0.4	0.5
Other	2.8	2.7	2.7	2.7	2.7	2.6
Total	3.0	3.0	3.0	3.1	3.1	3.1
Current liabilities						
Payables	0.4	0.6	2.7	3.8	5.0	6.2
Debt	0.0	0.0	0.0	0.0	0.0	0.0
Provisions	0.2	0.2	0.3	0.3	0.4	0.4
Other	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.6	0.9	3.0	4.1	5.3	6.6
Non-current liabilities						
Debt	0.0	0.0	0.0	0.0	0.0	0.0
Provisions	0.0	0.0	0.0	0.0	0.0	0.0
Total	0.0	0.0	0.0	0.0	0.0	0.0
Equity						
Issued capital	74.1	77.0	79.2	79.2	79.2	79.8
Reserves	2.2	2.2	2.2	2.2	2.2	2.2
Retained earnings	-72.4	-74.0	-73.0	-70.2	-65.8	-59.7
Shareholder equit	4.0	5.3	8.4	11.2	15.6	22.3

Valuation (\$m) as at 30 June 2019			
Discount rate	5%	10%	15%
Operations	159	76	42
Equity raisings post 30 June 2019	3	2	2
Cash 30 June 2018	2	2	2
Debt 30 June 2018	0	0	0
Total	163	80	46
\$ per share fully diluted	1.46	0.71	0.41

Valuation based on DCF of future cash flows

Sales revenue and costs grow 5% pa beyond 2026.

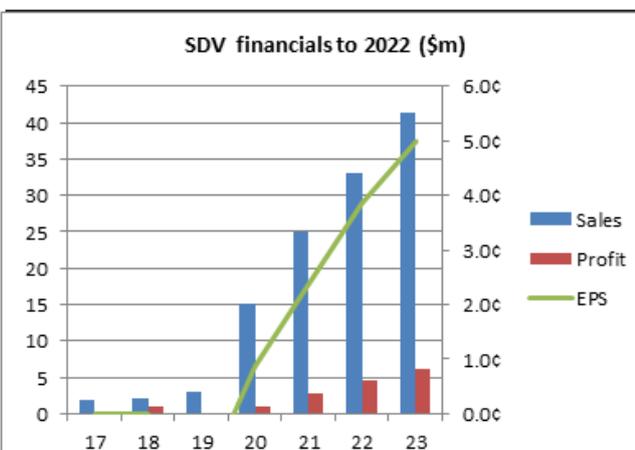
Per share data based on 112.3 million shares after assumed issue of 5.0 million shares at 0.23¢ in Jun H 2020.

Increase in valuation over time at a discount rate of 10% pa and revenue growth of 10% pa beyond 2026

	As at 30 June 2019	2020	2021	2022	2023
Operations	76	84	94	101	106
Future net equity raisings	3	1	1	1	0
Cash	2	2	2	5	9
Debt	0	0	0	0	0
Total	80	87	97	106	116
\$ per share fully diluted	0.71	0.77	0.86	0.95	1.03

Valuation (\$/share) as at 30 June 2019 at a range of discount rates and of growth rates beyond 2026

	Discount rates		
	5%	10%	15%
Growth rate 2.5% pa	2.5%	1.19	0.62
Growth rate 10% pa	5.0%	1.46	0.71
Growth rate 15% pa	7.5%	1.83	0.83



Company description

SciDev is a manufacturer and reseller of specialty chemicals such as flocculents and coagulents, mainly used in process plants to reduce the level of fine particles in waste water.

Sales are generally linked to deployment of SciDev's proprietary OptiFlow control systems to enhance performances, giving the company an advantage over other chemicals suppliers.

The business is still in its formative years but the potential is very large. The Australian market alone is thought to be \$250m in sales, and the global market some \$8.0b.

The industry

Introduction

The industry is that of supplying chemicals – flocculants and coagulants – used to clarify water. Both products do the same thing, which is to facilitate the removal of very fine solids suspended in water streams and thus: help clarify process plant water for re-use; help clarify surface water run-off; help sedimentation in clarifiers, thickeners and tailings dams; help dewater sludges or slurries within filtration or centrifugation processes; and help in the process of separating product from waste streams within process circuits.

Coagulation promotes the natural aggregation of fine particles during inter-particle collisions by enhancing naturally occurring, short range attractive forces between particles. Typically, coagulation aggregates particles in the 0.1 – 1 μm range to 1 – 10 μm range. The aggregates formed are dense with minimal water entrained within the structure. Coagulants are also effective in releasing additional “bound” water in heavily flocculated materials, such as belt press filters.

Flocculation aggregates particles in the 1 – 10 μm range to 100 – 10,000 μm range. The aggregates normally have a large quantity of water trapped within the macro-structure resulting in lower density particles, which is why coagulants can be used as described in the paragraph above. Flocculation typically works by bringing together small particles or aggregates into much larger aggregations using long chain molecules which bridge between particles and bind them into a macro-structure (floc).

Inorganic coagulants are widely used and these include aluminium and iron sulphates and chlorides, plus hydrated lime and magnesium carbonate. Organic coagulants are generally more expensive and comprise various polymers (such as polyamines) and copolymers, supplied in both liquid and powder form across a range of molecular weights and charge densities depending on the application.

The products are used in a wide range of industries including but not limited to mining and mineral processing, dairy and other food and beverage manufacturing, industrial liquid waste management, power generation, oil and gas production, paper and cardboard manufacturing, paint manufacturing, cosmetics manufacturing and personal products,

Size of markets

The global market for is about \$8.5b, with flocculants accounting for 95% and coagulants 5%.

I have some data for 2015 from industry consultant IHS Chemical which put the market for synthetic water soluble polymers at that time at 4.2Mt, with the biggest consumers estimated to be China 41%, North America 20%, Asia and Oceania (other than China) 18% Western Europe 16%, and the remainder 5%. The biggest classified by type of chemical were polyacrylamides 35%, polyethylene glycols 24% and polyvinyl alcohol 22%.

An announcement by SDV on 23 May 2019 put the size of the North American market at US\$1.4b.

Main suppliers

There are four main suppliers, being SNF with 40% of the market, Nuoer with 15-25%, Solenis with 10-15% and Kemira with 8-12%.

SNF is a privately owned company headquartered in France. According to its website it has 23 factories around the world, 5700 employees and 380,000 customers including those in North America 40%, Asia Pacific 25% and Europe 22%. In 2017 gross revenue was €2.5b - it sold 1.03 million tonnes of product, mostly flocculants and coagulants, also Xanthates for mineral flotation, and other products. The product was sold to customers in a range of industries including municipal water treatment 23%, oil and gas 22% and mining 11%.

Based in China, the Nuoer Group is privately owned by the founder, Mr Rong Minjie. It commenced operations in 2003 and has grown rapidly, with polymer-based flocculant manufacturing capacity now exceeding 300,000 tons per annum. The group recently commissioned a brand new, world class factory in Dongying to complement its existing facility in Guangrao. These facilities operate under ISO 9001 and ISO 14001 quality and environmental management systems.

Headquartered in Wilmington, Delaware, USA, Solenis operates 41 plants and employs 5200 people globally. It is owned by BASF¹ 49%, with the remainder owned by Solenis management and by funds managed by Clayton, Dubilier & Rice. This follows the merger in February 2019 of BASF's paper wet-end and water chemicals business with Solenis' existing business. Had the merger occurred at the beginning of 2017, sales in that year would have been €2.4b. Viewing the company's website, it is a much more diverse business than water treatment but within that segment, it offers a big range of products including coagulants but excluding flocculants.

Kemira is headquartered in Helsinki, Finland, but operates globally. In 2018 it had employees of 4,915 at the close of the year, revenue of €2.6b, EBITDA of €315m and NPAT

¹ The world's largest chemicals company.

of €95m. It has two divisions: Pulp & Paper (it is the world's biggest provider of chemicals to that industry, including in bleaching and pulping); and Industry & Water (focussed on Municipal and Industrial; and Oil and Mining). In 2018 coagulants accounted for 20% of revenues and polymers (flocculants) for 20%. Kemira describes itself as #1 in coagulants and #2 in flocculants, worldwide, but I am not sure that is entirely correct.

Science Developments Pty Ltd (SDPL)

Introduction

Science Developments is SciDev's key operating subsidiary. It sells coagulants, which it manufactures in Sydney, and flocculants which it now has toll manufactured by Nuoer. The company's current focus is primarily on the mining and oil industries.

Technology

For almost 15 years, Science Developments has focused exclusively on the research, development and manufacture of polymers for liquid-solids separation.

The company is headquartered at Kings Park near Blacktown in western Sydney where it has a factory, laboratory and warehouse. The Kings Park factory manufactures coagulant products using proprietary polymerisation technologies, including advanced copolymers for specific applications.

The company believes it has a competitive cost position because of its unique manufacturing process at Kings Park and also raw material synergies through the Nuoer relationship.

OptiFlox® System

Over recent years Science Developments has developed its OptiFlox® System, on which a patent is pending. It was originally designed to better address the problem known as 'blackwater' where the clarity of the water from coal tailings' thickeners deteriorates to an unacceptable level resulting in the plant shutting down and at times, coal production ceasing.

Under normal operations the incoming slurry is treated with flocculant but when significant clay is present (through changing seams, for example) then a coagulant is required to help clarify the wastewater. The OptiFlox® system continuously measures particle characteristics of the coal tailings slurry and the automatic addition of a coagulant is triggered when a certain proportion of clay is present. This minimises plant downtime, reduces the use of chemicals and enables consistent and reliable clarified water to be produced for return to the washing plant.

The system can also be employed in other dewatering operations within coal plants, such as belt presses, thickeners and flotation. It can also be employed on plants within the mining industry more generally, and indeed in any other industries where water/solids separation is challenging.

Where OptiFlox systems are installed Science Developments ensures it also obtains a contract for supply of the associated chemicals. The company receives monthly license and lease fees from customers employing the equipment, but most of its income is derived from sale of chemicals. In other words, it uses the OptiFlox system to facilitate sales. Since other suppliers of chemicals cannot offer this solution, it gives the company a key competitive advantage.

Recent progress

Since purchase of Science Developments in 2013 progress has been slow. While revenue increased by 16% pa during the five years from FY13 to FY18, to more than double what it was, costs have kept pace, and so EBITDA remained negative.

A much more substantial increase in revenues occurred in the June quarter 2019 and this improvement is likely to continue. We should see the company making profits hereafter.

Key strategic alliances

Nuoer Group

In February 2019 Science Developments entered into an agreement with the Nuoer Group to acquire from Nuoer's Australian operating entity Nuoer Chemical Australia Pty Ltd (NCA) the exclusive distribution and marketing rights over a ten year period in Australia and other Oceanic countries for polymer products produced by Nuoer. The consideration for the purchase was the issue of 1,666,667 SDV shares to NCA, escrowed for 12 months.

SciDev also placed 5 million shares to Jeffrey Zhang at 6¢ to raise \$300,000 as part of the recent capital raising exercise. Jeffrey Zhang owns 51% and is general manager of NCA, (the other 49% is owned by the Nuoer Group). When the deal was completed he also became a director of Science Developments, SciDev's main operating subsidiary.

The existing uncontracted revenue to NCA transferred to SciDev at the completion of the transaction, and in addition to Jeffrey Zhang two experienced Nuoer sales and marketing executives joined Science Developments. Essentially, the operations of NCA have been absorbed by Science Developments. In addition, the agreement allows Science Developments to work with the Nuoer Group to support opportunities globally in key target industries.

The alliance with the Nuocer Group was cemented and indeed expanded in May 2019 when a framework agreement for future strategic cooperation was signed by both parties. Through the framework agreement, SciDev and Nuocer Group are undertaking an in-depth analysis of market opportunities both within the region of their current arrangements and in other jurisdictions. The broadening cooperation between the two groups is expected to deliver *unparalleled industry reach*.

In summary the agreement with the Nuocer Group delivers Science Developments:

- Expanded market opportunities for the OptiFlox® technology.
- Supply chain security allowing access to additional end users.
- A vested world class partner that can manufacture PAM to company specifications.
- Synergies with the company's proprietary coagulant range and raw material sourcing.
- Access to world-class lowest-cost-quartile manufacturing and R&D capabilities.
- Additional skilled personnel to execute an existing Nuocer sales pipeline.

Phoenix Process Equipment Co.

In January 2018 Science Developments entered into agreement with Phoenix to evaluate the opportunity for the incorporation of the OptiFlox® technology into Phoenix's equipment offering; and assess the feasibility of a partnership to manufacture certain chemicals for dewatering applications using SciDev manufacturing technology.

Headquartered in Louisville, Kentucky, Phoenix is the world's largest integrated supplier of chemicals and dewatering equipment. The company is responsible for hundreds of installations worldwide, including over 600 in the US and quite a number in Australia.

Phoenix also supplies consumables including flocculants. Whilst Phoenix is not a manufacturer of the chemicals, it uses its equipment sales and technical support capabilities to pull-through chemical sales. This is a similar approach to that employed by SciDev with its OptiFlox® System and associated chemical sales but on a significantly larger scale.

Sinoz Group

The Melbourne-based Sinoz Group is currently a substantial SciDev shareholder and its managing director Simone Watt is on SciDev's board. The group is privately owned by the Watt family headed by Simone's father Nigel Watt. The main operating company Sinoz Chemicals & Commodities Pty Ltd is a leading global distributor of chemical reagents such as collectors (e.g. xanthates), frothers, activators and depressants that are essential for the flotation treatment of pyrite containing ores. Its Chinese partner Qixia TongDa Flotation Reagent Company is the largest xanthate manufacturer in the world. Other partner companies are Boric Chemicals Ltd based in Hong Kong and Flottec LLC based in New Jersey USA. Sinoz turnover is about \$250m and a major customer is Glencore for its base metal operations.

While not the subject of a strategic alliance agreement as such, the companies are close and SciDev envisages that the relationship will help the company move into supply of flocculants and coagulants in the base metals industry. Already, as outlined elsewhere in this report, a joint venture is underway to evaluate use of SciDev's chemicals and OptiFlox system at a copper/gold mine in SE Asia.

Peabody Energy

Peabody Energy Inc. (NYSE:BTU) headquartered in St. Louis, Missouri, is the world's largest private-sector coal producer. In 2018 it sold 187 tons to generate revenues of US\$5.6b. Its mines are located in the US and Australia. The US mines all sell steaming coal domestically and this accounts for the bulk of production. In Australia, steaming coal is exported from the Wambo mine (in JV with Glencore) in the Hunter Valley and from the Wilpinjong mine near Mudgee in NSW. Coking coal is exported from the Shoal Creek, Morevale, Millenium and North Goonyella mines in the Bowen Basin. Morevale and Millenium are about to close due to depletion of reserves, while the North Goonyella longwall is currently closed due to an underground fire but is scheduled to reopen before the end of this year.

Again, while not the subject of an alliance agreement as such, Peabody is currently SciDev's key customer with a select number of its mines using the OptiFlow system and buying SciDev chemicals both in Australia and the US. There is strong potential for increased SciDev sales as these services are extended to other Peabody mines. Importantly, as the world's leading non-government coal producer, Peabody is paving the way for other coal companies to follow.

Current business status

Peabody operations

On 5 March 2019 SciDev announced that it had secured a 12 month extension for use of the OptiFlox system and associated chemical supply at Peabody's 12 Mtpa Wilpinjong coal mine near Mudgee, NSW. The existing two year supply contract was about to expire.

SDV also supplies chemicals to two Peabody mines in the Bowen Basin.

Chemical sales into a Peabody Energy coal mine in the United States accounted for revenue of \$200,000 in the December quarter and are continuing. Warehousing has been established in Denver, Colorado, in support of this supply contract. In January 2019 SciDev received a purchase order for a commercial trial of an OptiFlox® system at this site.

US oil and gas industry

On 22 July 2019 SDV announced that it had received an order from a (unnamed) Permian Basin oil shale producer for \$1.08m of product for delivery in August and September via the Optiflox technology. The product was developed by SDV and is specifically designed to

reduce friction in proppant and oil hydraulic transport. It is being manufactured and shipped to SDV's US subsidiary by Nuoer. Order volumes from this customer are expected to increase after further commercial and field evaluations.

Being trialled at other customers

At a coking coal mine in the Bowen Basin, which I believe is one of those operated by BHP, the Optiflox system is being trialled on a Phoenix belt press filter in the coal handling and preparation (CHP) plant. The trial aims to establish the best way to optimise chemical dosing to the 24 filters on site. The chemical sales opportunity remains open. It is expected that an outcome will become evident within the next few weeks.

At the Ambrosia mineral sands mine in South Australia, owned and operated by Iluka, a multi-month trial of an OptiFlox system at a tailings thickener commenced in December 2018 and is ongoing; initial results are promising. A concurrent 15t chemicals trial controlled by the OptiFlox system took place over 5-10 days in February.

A joint project with the Sinoz Group was initiated during December 2018 to evaluate the ability of the OptiFlox[®] system to reduce base metal concentrate losses at Sinoz customer sites. A major copper/gold producer in SE Asia² was chosen as the proof of concept testing site. Laboratory evaluations subsequently illustrated that the OptiFlox[®] system could be effective in reducing copper losses. In May 2019 it was announced that Sinoz Group company Kemtec Mineral Processing Pty Ltd³ would trial an Optiflox system at the mine for a period of three months. Success would lead to a commercial contract with the mine involving lease of equipment and supply of chemicals.

Multiple rounds of product and technology evaluations on tailings from a major iron ore producer⁴ illustrated significant performance benefits over the incumbent treatment regime. SciDev chemicals have been submitted for independent testing with positive results likely to lead to full scale plant evaluations.

In the US a number of oil and gas producers are trialling product with good results.

Recent disappointments

In July 2018 SciDev received a purchase order for a commercial trial of an OptiFlox[®] System at Peabody Energy's North Goonyella coking coal mine, in the Bowen Basin, Queensland). However, due to the subsequent and on-going closure of the mine site from the effects of an underground fire at this longwall operation, this trial did not proceed. However, the mine is expected to reopen later this year and ramp-up production in 2020.

² This would either be the Sepon mine owned by Chinese-controlled MMG Ltd, or the Phu Kham mine owned by Chinese-controlled PanAust Ltd, both in Laos.

³ Kemtec is an incorporated JV company owned 50/50 by Sinoz Group and Flottec LLC.

⁴ This is probably Fortescue Metals Group (ASX: FMG).

Lion Dairy & Drinks (Lion) was SciDev's largest customer by revenue, with an OptiFlox system installed at one of its dairy factories along with purchase of SciDev chemicals. But due to a re-structuring that involved the divestment of its dairy manufacturing business, Lion advised that it was standardising its chemical sourcing requirements across its 20+ sites in Australia under one supplier. Consequently, SciDev ceased supply of chemicals to Lion in January 2019.

The imposition by President Trump of tariffs on a range of goods imported into the US from China has affected SciDev channels to import product into the US from the Nuocer Group but has also opened up new opportunities.

Revenue opportunities

Optiflox units

Optiflox units have a manufacturing and installation cost of \$70-80,000. Rent of each unit is expected to be about \$7,000 per month.

Coal

Peabody's Wambo mine extracts some 7Mtpa (or is it 14Mtpa?) ROM thermal coal from the Warkworth seam which is notoriously dirty and the operation probably spends \$4m annually on water clarification chemicals, mainly in the tailings thickener.

Other coal mines are not as bad. For example, in the Bowen Basin the seven mines operated by BMA (BHP Mitsubishi Alliance) would spend in aggregate \$5m annually on the chemicals.

Mineral sands

Iluka spends some \$3m annually on flocculants and coagulants at Jacinth-Ambrosia in SA, and possibly a similar sum at Cataby in WA. It also has an operation in Sierra Leone. SciDev has a good chance of securing contracts for these operations.

Success with Iluka would open up the mineral sands industry to SciDev.

Gold and base metals

The copper/gold mine in SE Asia being trialled at present would probably require two Optiflox units. Chemical sales would be relatively small at perhaps \$250,000 annually but the profit margin should be quite high because use of the Optiflox system in the concentrate thickener circuit could significantly enhance copper recovery.

Success here would open up other opportunities in the copper and gold industry, some of them quite large. For example, Newcrest's Lihir mine would probably spend around \$5m annually on these clarification chemicals. With a Newcrest employee having recently joined SciDev board as a non-executive director, there may be some traction there.

The Escondida operation in the Atacama Desert in Chile, operated by BHP, would be a prime target, being the largest copper mine in the world (some 125Mt of ore was concentrated in 2018) and located in a very dry environment where water is precious.

Of course there are many other examples.

Iron ore

Direct shipping operations such as hematite mines use water to reduce dust emissions in ore crushing, sorting and transportation and to wash ore in tromelling circuits. Operations employing concentration processes on lower grade ores such as magnesite naturally require much more water than direct shipping ores. Where water is sometimes scarce, such as in the Pilbara, as much water as possible is recycled and the use of clarifiers assists in this process.

Bauxite and alumina

Production of bauxite requires a modicum of water to reduce dust during the crushing and transportation processes, whereas alumina refineries produce substantial waste material (red mud) that is emplaced in tailings dams after much of the water is removed in thickening tanks. The modern practise is “dry stacking” which involves depositing and drying the residue in thin layers to a high density, thus making it more stable and unlikely to flow in the event of a containment breach.

General comments

Water is of course an important part of the global mining industry and where water is scarce and where there is some risk of tailings dam failure, it is becoming increasingly important to extract water from waste streams. So the business in which SDV is engaged has a strong growth profile.

Oil industry

Use of chemical clarifiers is critical in improving the quality of waste water generated by the upstream oil and gas industry, particularly in the enhanced oil recovery (EOR), coal seam gas and shale oil segments in which substantial quantities of water are used and released. It is a combination of formation water that is present in the well and the oil well injection water. Such oily produced water (OPW) is the largest waste stream associated with oil and gas production. Before it can be used for enhanced oil recovery (EOR), placed in a disposal well, or discharged offshore, OPW's entrained oil and suspended solids content must be reduced to a level that meets HSE regulations, protects formation rheology, and limits equipment corrosion. This generally requires the use of flocculants.

In the water flooding or polymer flooding EOR technique, flocculant is introduced into the water being injected to increase the viscosity of the water and thus increase oil recovery.

A conservative estimate is that the oil industry in the US uses 250,000tpa of flocculant with a value of over US\$600m.

Oil sands

The oil sands industry in northern Alberta is a very large consumer of chemical clarifiers. Main operators are Canadian Natural Resources Ltd (TSE:CNQ, C\$33.88, C\$41b), Suncor Energy Inc. (TSE:SU, C\$40.065, \$C64b), Imperial Oil Resources Ltd (TSE:IMO, \$36.12, C\$28b) (owned 69.6% by Exxon Mobil) and Syncrude (a joint venture owned 58.7% by Suncor, 25% by Imperial Oil and 16.2% by Sinopec). As far as I could determine crude oil production in 2018 by these operators was about 435 million bbl. I saw somewhere that for every barrel of crude bitumen extracted, 3.3m³ of tailings are discharged, suggesting that in 2018 the volume of tailings produced by them was 1.4 billion m³. By 2017 tailings ponds contained 1.2 trillion litres of contaminated water and covered a remarkable 220km² in the region.

Without measures to reduce the water content, the fresh tailings consolidate after a few years with the sand particles settling to the bottom. But most of the tailings (mature fine tailings or MFT) remain for decades in colloidal suspension containing negatively charged clays (<2µm) some 30-35% by weight, water 65% and residual bitumen 3-5%. So removing clean water from the tailings is a key priority, not only to reduce the volume of tailings and the decades of waiting required to reclaim the land, but also to recycle the water, which is required as part of the production process and otherwise drawn from the Athabasca River.

The Alberta Energy regulator has tightened measures over the years. The current Directive 85, which came into effect in 2016 and was amended in 2017, requires operators to process their “fluid tailings” to a standard that is “ready to rehabilitate” (RTR) within 10 years of mine closure. In order to achieve this, a number of techniques are used, such as atmospheric drying. Most of these techniques require the use of polymers, mostly flocculants such as anionic polyacrylamide (PAM), and some metal salts as coagulants. It is not clear at this point whether current technology can achieve compliance with Directive 85 and research into development of more effective methods including flocculants is ongoing.

The present consumption of flocculants by the industry is thought to be some 65,000tpa with a value of around US\$160m. I understand the two main suppliers are SNF Floerger and Kemira.

SciDev is carrying out research on new polymers and has held discussions with the oil sand producers in an effort to capture some market share.

Tartana Resources Ltd (ASX:TRL)

SciDev owns approximately 13.6 million TRL shares which will be escrowed for 2 years post an intended IPO at 20¢ now being advanced by that company. The TRL shares are not a core asset of SciDev and are likely to be sold once they come out of escrow. Based on the intended IPO offer price of 20¢ the shares would have a value of \$2.7m but of course there is no guarantee that such will be available in two years.

TRL's main asset is the Tartana copper/zinc exploration project near Chillagoe in north QLD, within a highly mineralised belt. Its other assets comprise a zinc-rich slag dump near Zeehan in TAS and a couple of other mineral exploration projects.

SDV obtained the shares in TRL as a result of selling to it the Zeehan slag dump in January 2018 for a consideration of \$2m. As a result of the sale a net gain of \$1,989,200 was recorded within 'other revenue' in the FY18 accounts. The consideration was to have been paid through a mix of shares and cash, but this was varied in order to assist TRL obtaining its ASX listing. The final deal was approved at a general meeting of SDV shareholders in March 2019 as a result of which SciDev received 13,589,744 TRL shares and \$200,000 cash⁵.

⁵ The original deal was that SDV would receive 15 million shares at a deemed price of 10¢ and \$500,000 cash, but due to unforeseen circumstances SDV only received part payment in the form of about 8 million shares and \$300,000 cash. This was varied after the new deal approved by shareholders in March 2019 so that SDV then received additional shares to take the total to 20 million TRL shares at a deemed price of 10¢, and the \$300,000 cash that had been received previously by SDV was repaid to TRL, funded through sale of 6,410,256 TRL shares at 7.8¢ to unrelated third parties to raise \$500,000 cash. The net result is that SDV received 13,589,744 TRL shares and \$200,000 cash.

Earnings projections

For the year ended 30 June 2019

On 31 July SciDev announced that FY19 revenues were more than \$3m compared with the \$2.0m achieved in FY18, including \$1.2m in the June quarter. I allow for sales revenue of \$3.0m and COGS of \$2.0m for a gross profit of \$1.0m or 34%. This compares with sales of \$1.1m, COGS of \$0.7m and a gross profit of \$411,000 in the first half year.

I allow for other revenue of \$481,000, being interest income \$15,000, R&D tax rebates \$333,000 (all in the first HY) and other items of \$133,000 (again, all in H1). I allow for general expenses of \$2.9m, up from \$2.1m in FY18.

That would result in an EBITDA loss of \$1.4m, worse than the \$0.8m loss in FY18. The deterioration despite the higher gross profit is due to the increase in costs associated with putting the company on a better footing from which to grow, including the addition of senior employees.

However, it is likely that the June Quarter saw a profit being made.

For FY20 and beyond

I envisage the company turning increasingly profitable hereafter. Profit projections further out are largely a function of sales revenue. It is clear to me that there will be a substantial increase each year over the next several years, but to what extent is difficult to judge. For the sake of the exercise:

- I allow for sales revenue of \$15m in FY20, of \$25m in FY21, of \$33m in FY22, etc. The company believes that all going well, these projections could be conservative.
- I allow for gross profit margins after deducting COGS to be 27% in FY20 and 25% thereafter. Again, the company would hope to do better than this.
- I allow for an increase in other costs of \$300,000 annually through FY22 and thereafter an increase at half the rate of revenue growth.

That would result in EBITDA of \$1.2m in FY20, of \$3.0m in FY21, of \$4.7m in FY 22, etc. Further detail can be obtained from the table on Page 2 of this report.

With all options now in-the-money, projected EPS data is fully diluted.

Financial position

The company ended FY19 with cash of \$1.8m and no debt after receipt of \$2.3m from issue of new shares in the June HY.

The growth in business projected for FY20 will require a large increase in working capital. This would be challenging to fund. I allow for the exercise of the existing 3.95 million options at 25¢ in November to raise \$1.0m. I also allow for a further \$1.5m in equity funding during that year through an issue of 5 million shares at 23¢ (a 10% discount from current prices) to maintain a solid financial position. I estimate that the year will finish with a cash position of \$1.8m after receipt of that funding.

Thereafter, funding should not be a problem. In fact an increasing surplus cash position will emerge over the years. Payment of dividends cannot occur until prior losses have been eliminated, which would occur during FY26 on my numbers, at the end of which the cash position would be \$30m. It would be possible to undertake a capital return earlier than that although I have not allowed for it.

Valuation and share price target

Valuation

I have calculated the NPV of discounted net cash flows at discount rates of 5%, 10% and 15%. My detailed financial model goes to 2026 only, and beyond that year I extend a single line of the model, being net cash flow prior to dividend payments, at growth rates of 2.5%, 5% and 7.5%. This has given me a range of possible valuations, using 30 June 2019 as the base.

At the middle of the range, being a 10% discount rate and a growth rate of 5% beyond 2026, the valuation would be 71¢ per share. The valuation grows at some 8% annually, so that by 30 June 2020 the valuation would be 77¢.

I write “would be 71¢” rather than “is 71¢” because the parameters one should use are not known with any certainty. One could argue, for example that a discount rate of 10% is too low given the uncertainties of forecasting SciDev’s future cash flows. At a 15% discount rate (and still using a 5% growth rate beyond 2026) the valuation would be 41¢, not 61¢.

Share price target

The current share price suggests that investors are already anticipating a degree of future success for the company. But if my earnings projections are in the ballpark then the shares could at least double. For example a 60¢ share price would place the shares on a PE of 69 based on 2020 earnings, falling to 25 times 2021 earnings and 16 times 2022 earnings.

But to achieve my earnings projections SciDev would require some big contract wins.

Corporate

Directors

The board of directors comprises:

- Trevor Jones, non-executive chairman
- Lewis Utting, managing director and CEO
- Simone Watt, non-executive director
- Jon Gourlay, non-executive director

Trevor Jones (B.Comm) spent 30 years in stockbroking⁶, corporate finance and funds management. He was appointed a non-executive director of SDV in February 2007 and became chairman in January 2008.

Lewis Utting (B. App. Sc.) has over 15 years of experience in the water treatment, mining and chemical industries, principally with BASF, the world's largest chemical producer, where he became the global project manager and global business development manager for the mining solutions business. He was recruited by SDV as project director in March 2018 and joined the board as executive director in October 2018. He became managing director and chief executive officer in April 2019 following Kieran Rodgers' retirement (see below).

Simone Watt (B. App. Sc.) is the managing director of Sinoz Chemicals and Commodities (refer to page xx). She was appointed to the SciDev board in October 2018.

Jon Gourlay (B. Comm, CA) was appointed to the board in May 2019. He is currently commercialisation manager for technology and innovation at Newcrest Mining Ltd (since 2011), with prior roles in investor relations, analysis and improvement of Newcrest's operations at the Lihir Island gold mine, PNG. Interestingly, he requested remuneration on an equity basis rather than cash (refer to page xx).

A long standing board member, Kieran Rodgers, retired from the board in March 2019. He became an employee of SDV in March 2001, was appointed an executive director in February 2007 and managing director in February 2012.

⁶ I was a mining analyst at County Natwest Securities when he was in the London office.

Management

The management team reporting to Lewis Utting includes:

- Heath Roberts (Dip.Law), company secretary and general counsel, appointed March 2017. Heath is a commercial solicitor with over 20 years of experience. He has acted as company secretary and/or director for numerous ASX listed and private companies. He has particular strength in corporate operations and compliance, asset due diligence and acquisitions and equity/debt funding, focused on the resources, IT and healthcare sectors.
- Jeffrey Zhang (PhD Mech. Eng.), manager marketing and strategy, appointed February 2019. Jeffrey has over 12 years of experience in the development of western quality specifications for Chinese manufacturers. Most recently, Jeffrey was successful in securing a significant supply contract for Nuocer China to BMA coal. Jeffrey successfully managed this business for three years before joining the SciDev team.
- Jamiel Muhor (B.Eng. (Env.), P Eng) , manager business development, appointed June 2018. Jamiel gained a degree in environmental engineering at Deakin University in 1998. He has over 15 years of experience in the water treatment, mining and chemical industries. He began his career with Ciba, which was subsequently acquired by BASF. Jamiel's most recent position at BASF was head of mining technology for Asia Pacific. Previous roles at BASF included global account manager for BHP, global account manager for Alcoa and key account holder in the Canadian oil sands industry. Prior to becoming employed at SciDev, in May 2018 Jamiel had joined Lewis Utting in a consultancy business.
- Sam Jiang (B.Com, M.Com, CPA), financial controller, appointed April 2019. Sam has over 10 years of experience in financial roles, most recently as financial controller for a major medical equipment provider. His direct experience is in management accounting, manufacturing and export.

Equity structure

Current structure

The equity structure that will be in place once all options are issued is as follows:

- 107,263,157 ordinary fp shares
- 3,950,000 unlisted 25¢ options expiring 28 November 2019
- 2,000,000 unlisted 10¢ options expiring 23 July 2022 (to be issued shortly)
- 3,350,000 unlisted 12¢ options expiring 23 July 2022 (to be issued shortly)

In March/April 2019 the number of shares on issue was boosted by 43.4 million shares through a \$2.5m capital raising. It comprised a \$1.25m placement at 6¢ in two tranches, and a non-renounceable 2:7 entitlement issue at 6¢ to raise \$1.25m underwritten by Taylor Collison. The funds were used to bolster working capital and facilitate expansion of sales.

On 19 June 2019 it was announced that the directors and senior employees were to be granted options to purchase ordinary shares. On 23 July 2019 those options proposed for directors were approved by shareholders at a general meeting. The options will have a term of three years to 23 July 2022 and presumably will be issued shortly. Details are provided in Figure 1.

Figure 1: Options approved for issue

Grantees	Vesting conditions	Strike	Options
Lewis Utting	Profit breakeven	10¢	2,000,000
Jon Gourlay	nil	12¢	650,000
Trevor Jones	nil	12¢	250,000
Simone Watt	nil	12¢	250,000
Employees	various	12¢	2,200,000
Total			5,350,000

Source: Company reports

I should add that although the terms of the approved options appear to be overly generous in view of the current share price, the shares had closed at 7.5¢ on 19 June when the notice of meeting was issued. Subsequent to that, the shares have more than trebled.

Shareholders

There are two substantial shareholders (defined as holding at least 5% of the shares). They are Wattcon Consulting Pty Ltd 6.4% and Jeffrey Zhang/Nuoer⁷ 5.7%.

- Wattcon is controlled by Nigel Watt who also controls the Sinoz Group. It became a substantial shareholder on 2 July 2018 when it acquired 4.098 million shares by participating in a placement at 6¢. By 21 October (as disclosed in the annual report) the holding was put at 6.842 million shares. When Simone Watt became a director her holdings were deemed to include this shareholding. Wattcon did not participate in the recent capital raising.
- Jeffrey Zhang became a shareholder when he subscribed to 5.0 million shares at 6¢ in Tranche 1 of the recent placement. In addition the 1.667 million shares issued to Nuoer Chemical Australia Pty Ltd (NCA) are included as part of his substantial shareholding. The latter shares are subject to a voluntary 12-month escrow.

Some of the other directors' holdings are also significant. In fact all the major shareholders are associated with current and past directors albeit Zhang is a director of Science Developments rather than SciDev itself. Refer to Figure 2 overpage.

Figure 2: Major shareholders (more than 2.5% holdings)

Shareholder	Current mill shares	Current %
Wattcon Consulting Pty Ltd	6.842	9.5%
Jeffrey Zhang & associates	6.167	5.7%
Kieran and Patricia Rodgers	5.066	4.7%
Lewis Utting and Helena Lehos	4.831	4.5%

Source: Company report, my estimates

Lewis Utting became a major shareholder on 29 June 2018 when he purchased 3.5 million shares by participating in a placement at 6¢. On 26 November 2018 he purchased a further 79,100 shares at 8.0¢ on market. In March 2019 he participated in the entitlement issue through purchase of a further 1.1 million shares at 6¢.

The only directors who are not major shareholders are Trevor Jones, who holds 738,303 shares, and Jon Gourlay, who holds 206,349 shares.

Other significant shareholders as at 21 October (disclosed in the 2018 annual report) included Paul Pembroke with 2.0 million shares who was one of the vendors of Science Developments Pty Ltd to SciDev.

⁷ A substantial shareholder notice has not yet been issued for this holding.

Option holders

The existing 25¢ options were issued in December 2014 and August 2017. They are held as follows:

Figure 3: Existing option holders

Lewis Utting	500,000
Kieran Rodgers (ex-director)	200,000
Don Cronin (ex-director)	200,000
Trevor Jones	100,000
Robert Waring (ex. coy secretary)	50,000
Other ex-employees	650,000
Taylor Collison (stockbroker)	2,250,000
Total	3.950,000

Source: Company reports

NEWING RESEARCH

History

Background

SciDev Ltd was known as Intec Ltd (ASX: INL) until March 2017. The company was listed on ASX in 2002 and had been focussed on development of the Intec hydrometallurgical process, which used a chloride leach process for extraction of copper, other base metals, gold and silver from difficult to treat ores. Unfortunately the process was never able to be commercialised despite its advantages.

In December 2003 through December 2008 Intec owned a small scale tailings and mining operation at the former Hellyer Pb/Zn mine in Tasmania before lower prices forced closure. In addition the company's Burnie plant was involved with extracting a low grade zinc concentrate from EAF dust mixed with slag from the old Zeehan smelter, but that activity ceased in 2012.

In February 2012 the then finance director and CFO Kieran Rodgers became managing director in a board reshuffle concurrent with a placement at 15¢. From that point the focus was in cutting costs to a more sustainable level and seeking new business opportunities.

In November 2013 the company acquired a 50% interest in Science Developments Pty Ltd at a cash cost of \$1.3m, with an option to increase to 100%. The other 50% of Science Developments was acquired from Paul Pembroke in February 2017 for \$660,000 in cash and 20 million shares (2 million post consolidation). The company's name change to SciDev soon followed, and Science Developments has become the company's sole focus. The Science Developments business is described elsewhere in this report.

Equity raisings

In December 2018 the company's equity capital was consolidated on a 1:10 basis, so the number of shares issued and issue prices within Figure 4 are adjusted accordingly.

Figure 4: Equity raisings from 2010

Date	Description	Amount raised (\$000)	Shares issued ('000)	Issue price (¢)
19 Nov 2010	Placement	750	2,500	30
7 Feb 2012	Placement	1,250	8,333	15
12 Dec 2016	Placement	1,500	12,500	12
12 Jan 2017	SPP	600	5,000	12
25 Jun 2018	Placement	860	14,333	6
18 Mar 2019	Placement/entitlement issue	2,500	41,666	6

Source: Company reports

Financial history

The numbers for the past 8 financial years are provided in Figure 5. As can be seen, the performance has been very ordinary, bearing in mind that the company acquired Science Developments in 2013. There has been modest growth in revenue since then, but no growth in EBITDA. The leap in NPAT during 2018 was only due to proceeds from sale of assets.

Figure 5: Historical financial data (\$000)

	2011	2012	2013	2014	2015	2016	2017	2018
Profit								
Revenue	8,038	2,825	1,066	1,281	1,537	1,774	1,925	2,214
EBITDA	2,299	-463	-916	-780	-814	-261	-296	-816
Pretax profit	1,117	-1,855	-2,626	-1,332	-914	-373	-473	994
NPAT	1,524	-3,098	-2,568	-1,178	-856	-458	-957	1,002
Growth								
Revenue				+20%	+20%	+15%	+9%	+15%
Cash from								
Operations	1,509	-3,330	-829	-635	-1,081	-541	-225	-892
Investing	-42	947	2,831	-1,165	130	134	-903	89
Financing	898	1,226	0	141	129	-41	1,589	433
Balance sheet								
Closing cash	2,557	1,400	3,403	1,748	926	478	939	568
Closing debt	0	0	0	203	369	308	44	32
Net assets	8,437	6,671	4,043	3,052	2,243	1,767	2,462	3,950
Accum. losses	-64,556	-67,654	-70,224	-71,401	-72,218	-72,699	-73,381	-72,379

Source: Company reports

Recent profit statements

Again, no improvement was seen in underlying profit over the last couple of years. In FY18, sales revenue increased by 10% to \$2,029,000 but cost of sales increased 25%, so gross profit fell 9% to \$773,000. The gross profit margin was 38%, down from 46% in the previous year.

Other income was up 59% to \$511,000 due mainly to a big rise to \$303,000 in R&D tax rebates from the government.

General expenses rose a whopping 44% to \$2,100,000 and in fact this was the main factor in the EBITDA loss more than doubling to \$816,000. It reflected a boost in labour and other resources required to generate growth in future years.

Interim profit FY19

SDV made a net loss of \$627,000 in the half year to 31 December 2018, up from \$595,000 in the previous corresponding period. Sales revenue was \$1,136,000, up 22%, gross profit was \$411,000, up 7% and the gross profit margin was 36%, down from 41%. The killer was general expenses of \$1,407,000, up 42%; the saviour was other revenues of \$479,000, up from \$97,000 and boosted by a R&D tax rebate of \$333,000. EBITDA was a loss of \$517,000 up 2%.

Figure 6: Recent annual and half year profits (\$000)

	FY17	FY18	H1 FY18	H2 Y18	H1 FY19
Gross profit					
Sales growth		10%			22%
Sales revenue	1,847	2,029	934	1,095	1,136
Cost of sales	1,002	1,256	550	706	725
Profit margin	845	773	384	389	411
Profit margin %	45.7%	38.1%	41%	35.6%	36%
Other revenue					
Interest income	13	13	5	8	13
R&D tax rebates	218	303	0	303	333
Reimbursements	25	24	12	13	-
Other revenue	65	171	81	90	133
Total other revenue	321	511	97	414	479
General expenses					
Employees	741	1,006	443	563	540
Other costs	721	1,094	546	548	867
Total	1,462	2,100	989	1,111	1,407
Pretax profit					
EBITDA	-296	-816	-508	-308	-517
Financing cost	-27	-6	3	-9	4
Forex gains	-	20	-	20	-
Sale of assets	-	1,989	-	1,989	-
Depn and amortn	-152	-194	-89	-105	-86
Pretax profit	-474	994	-595	1,587	-599
Net profit					
Income tax expense	-124	8	-4	12	28
NPAT	-599	1,001	-591	1,591	-627
Minorities	-84	-	-	-	-
NPAT attributable	-682	1,002	-591	1,591	-627

Source: Company reports

Recent quarterly cash flows

The trend of increasing sales receipts over the past four quarters has not translated into any meaningful reduction in operating cash flow deficits, because of higher costs. Cash was boosted by the capital raising in the last two quarter but the position won't last for long unless cash from operations shows some improvement. The detail is shown in Figure 7 below.

Figure 7: Recent quarterly cash flow (\$000)

Qtr ended	30 Sep 2017	31 Dec 2017	31 Mar 2018	30 Jun 2018	30 Sep 2018	31 Dec 2018	31 Mar 2019	30 Jun 2019
Cash from operating activities								
Receipts from customers	501	601	567	639	600	669	760	766
Suppliers and corporate overhead:	-701	-513	-594	-803	-791	-917	-1,157	-679
Staff costs	-212	-200	-324	-255	-270	-301	-236	-375
Interest received	3	2	1	1	1	2	10	3
Interest paid	-2	-1	-2	-1	-1	-3	-1	
Income tax paid					-32			
Government R&D tax concession refund				303		333		
Total	-411	-111	-352	-116	-493	-217	-624	-285
ACTUAL	-411	-111	-352	-116	-493	-217	-624	-285
Cash from investing activities								
Intellectual property	-4	-24	-4	-14	-9	-15	-4	-10
Sale/(Purchase) of businesses		250			50			
Purchase of fixed assets	-5		-1		-46	-18	-3	-49
Sale of fixed assets								190
Total	-9	226	-16	-14	-5	-33	-7	131
ACTUAL	-9	226	-16	-14	-5	-33	-7	131
Cash from financing activities								
Equity capital				445	415		1,737	578
Borrowings	-2	-5	-2	-4	-2	69	-30	-46
Total	-2	-5	-2	441	413	69	1,707	532
ACTUAL	-2	-5	-2	441	413	69	1,707	532
Cash position								
Opening balance	939	517	627	257	568	483	302	1,378
Net cash flow	-422	110	-370	311	-85	-181	1,076	378
Forex adjustments								
Closing balance	517	627	257	568	483	302	1,378	1,756
ACTUAL	517	627	257	568	483	302	1,378	1,756

Source: Company reports

Disclaimer

This analysis is cursory in nature and is not intended to be relied upon by third parties, who should make their own enquiries. The report does not contain investment advice.

Any views expressed in this report are purely my own unless otherwise indicated.

Disclosure

I have not received any remuneration from any person for this report.

Associated entities own 1.7 million shares in SDV at the time of writing.

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