# Sandur Manganese

Discussion for VP Group

Disclaimer: This is for educational purpose and discussion only. The presenters may be invested in their individual and client capacity.

# What does company do?

- Produces iron ore (EC clearance upto 1.6 MTPA), manganese ore (EC clearance upto 0.6 MTPA) and ferro alloys (using 32 MW captive power source); Ores are sold through e-auction
- Iron ore extraction fully mechanized; manganese semi-mechanized (resulting in lower EBITDA margins because of higher manpower cost); Manganese extraction limited to 0.25 MTPA because of high manual labor demand
- Large capex (1500 cr.) to make steel plant (in 3 phases)
  - First phase (600 cr.) to be funded by debt (400 cr.) + internal accruals (200 cr.). Setup integrated 1 MTPA steel plant. Can generate stable state EBITDA of 220-250 cr. (Focus on operational excellence by reusing energy making them cost competitive)
  - Subsequent phases to commence after stabilization of Phase 1

# Rich heritage (rare honest company in an otherwise dirty industry)

- Was the only mining lessee to be awarded 5-star rating in Karnataka and one of the only three of 5-star rated lessee in India
- Have given up land twice to the government which had proven reserves
- CSR activities

Huge asset base. 3200 ha of mining rights. 1200 ha still unused.

#### Rating Rationale

October 29, 2020 | Mumbai

#### The Sandur Manganese And Iron Ores Limited

Ratings Reaffirmed

#### Rating Action

| Total Bank Loan Facilities Rated | Rs.470 Crore                  |
|----------------------------------|-------------------------------|
| Long Term Rating                 | CRISIL A-/Stable (Reaffirmed) |
| Short Term Rating                | CRISIL A2+ (Reaffirmed)       |

1 crore = 10 million

Refer to annexure for Details of Instruments & Bank Facilities

#### <u>Detailed Rationale</u>

CRISIL has reaffirmed its rating on bank facilities of The Sandur Manganese and Iron Ores Limited at 'CRISIL A-/Stable/CRISIL A2'.

The ratings continue to reflect a strong market position as the fifth-largest iron ore miner in Karnataka and the largest private miner of manganese ore in India, supported by a track record of more than six decades with large mining reserves and a long tenure of mining licences and strong financial risk profile. These strengths are offset by project risk related to large ongoing debt funded capital expenditure plan, susceptibility to heightened regulatory risks and vulnerability of operating margin to commodity prices.

#### Analytical Approach

CRISIL had earlier taken a consolidated view on the business and financial risk profiles of SMIORE and its subsidiary, Star Metallics and Power Private Limited (SMPPL). However, CRISIL is now taking a standalone view on the business and financial risk profiles of SMIORE due to amalgamation of SMPPL with SMIORE as on 1st April 2019.

#### Key Rating Drivers & Detailed Description Strengths:

#### \* Long track record and extensive mining reserves:

SMIORE was set up in 1954 when Mr Y R Ghorpade, the former Maharaja of Sandur, transferred the lease awarded to him in the company's name. Currently, it has two mining leases valid up to 2033, with estimated reserves of almost 118.5 million tonne of iron ore and around 14.7 million tonne of manganese with production capacity of 1.6 million tonne per annum (TPA) for the former and 0.289 million TPA for the later. The company is among the few entities with category 'A' iron ore mining leases with production capacity of more than 1 million TPA. The extensive reserves, long validity of the mining licence, and presence of more than six decades in the industry are expected to continue benefiting the group in the near term.

#### \* Strong financial risk profile; likely to be maintained despite planned capex:

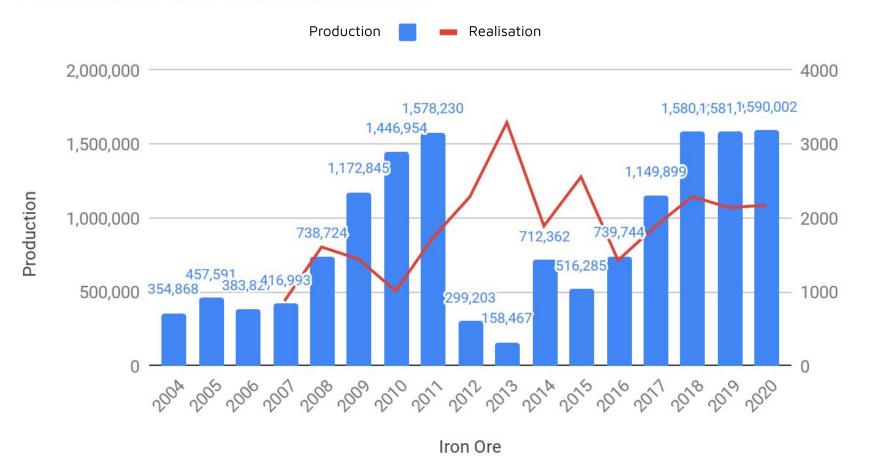
The group had a combined networth of more than Rs 838 crore as on March 31, 2020, on account of steady accretion to reserves over the years. Despite the planned debt-funded capex, the capital structure is expected to remain sound, with total outside liabilities to tangible networth ratio at less than 1 time in the next two fiscals. Interest outlay will increased sharply, owing to the term debt raised for funding the capex, in fiscal 2020. Nevertheless, the Sandur group's interest coverage and net cash accruals to total debt (NCATD) ratios are expected to remain in the range of 15 - 20 times, and 0.4 - 0.6 times respectively, over the next two fiscals.

#### Weaknesses:

#### \* Exposure to project risk related to large ongoing debt funded capital expenditure plan: The group has commenced a major debt-funded capex programme, budgeted at over Rs 650 crore. This is to be funded

through term debt of Rs 400 crore and internal cash accrual parked mainly in debt mutual funds. The capex is multipronged, wherein the group plans to set up a 0.4 million TPA coke oven facility, a 30 megawatt (MW) waste heat recoverybased (WHRB) power plant, and also upgrade the existing ferroalloy plant apart from establishing additional evacuation infrastructure for its mines. The group would be adding another furnace and would be upgrading the existing furnace

### Production and realization trend



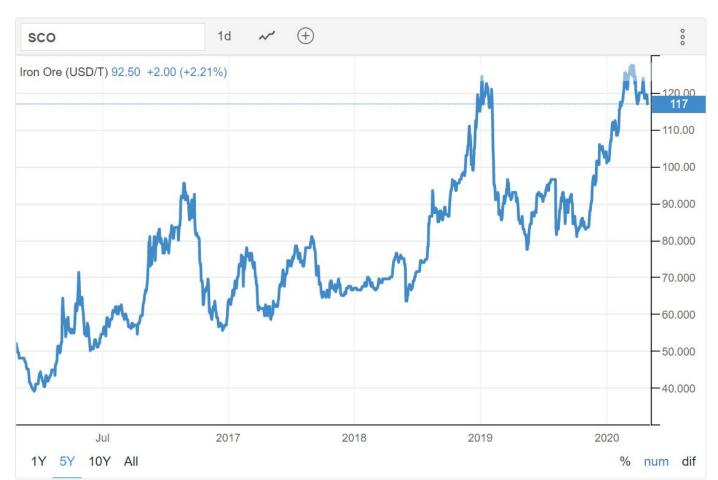
## Is it really very cyclical like the usual opinion?

| Iron Ore               | 2011      | 2012    | 2013    | 2014    | 2015    | 2016    | 2017      | 2018      | 2019      | 2020      |
|------------------------|-----------|---------|---------|---------|---------|---------|-----------|-----------|-----------|-----------|
| Production             | 1,578,230 | 299,203 | 158,467 | 712,362 | 516,285 | 739,744 | 1,149,899 | 1,580,021 | 1,581,000 | 1,590,002 |
| Sales                  | 1,107,680 | 514,791 | 233,813 | 909,956 | 568,592 | 884,292 | 1,193,615 | 1,332,386 | 1,491,016 | 1,545,000 |
| Salvaged from<br>Dumps | *         | *       | *       | 405856  | 81584   | *       | *         | *         | *         |           |
| 9                      |           |         |         |         |         |         |           | 23        |           |           |
| Sales Value            | 192       | 118     | 77      | 172     | 145     | 126     | 225       | 305       | 319       | 335       |
| Realisation            | 1730      | 2284    | 3289    | 1889    | 2554    | 1425    | 1884      | 2287      | 2138      | 2171      |

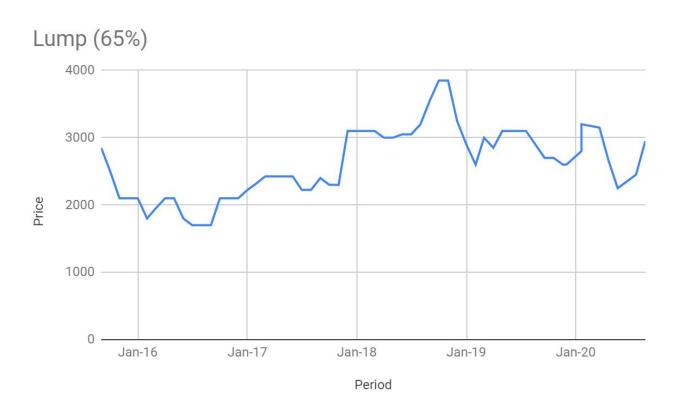
2013 was the year of ban.

2016 was the worst year for steel industry in more than a decade.

## Iron Ore price trend - international



## NMDC Iron Ore price trend - domestic



### Iron Ore business is a cash cow!

| screener FEED                       | SCREEN   | 5 10     | OLS           |          |           |          |          |          | Q Search  | ior a compa | iriy     | AYUSH V  |
|-------------------------------------|----------|----------|---------------|----------|-----------|----------|----------|----------|-----------|-------------|----------|----------|
| Sandur Manganese Chart Analysis     | Peers    | Quarters | Profit & Loss | Balance  | e Sheet C | ash Flow | Ratios I | nvestors | Documents |             |          |          |
|                                     | Mar 2009 | Mar 2010 | Mar 2011      | Mar 2012 | Mar 2013  | Mar 2014 | Mar 2015 | Mar 2016 | Mar 2017  | Mar 2018    | Mar 2019 | Mar 2020 |
| Sales                               |          |          |               |          |           |          |          |          |           |             | Amount   | Growth % |
| Mining                              | 423      | 277      | 340           | 153      | 123       | 220      | 201      | 166      | 320       | 444         | 513      | 494      |
| Ferroalloys & PowerFerroalloys & Po | 0        | 0        | 10            | 25       | 44        | 89       | 104      | 59       | 130       | 186         | 208      | 110      |
| Services                            | 2        | 0        | 0             | 0        | 0         | 0        | 0        | 0        | 0         | 0           | 0        | 0        |
| Ferroalloys/Sponge Iron             | 4        | 0        | 0             | 0        | 0         | 0        | 0        | 0        | 0         | 0           | 0        | 0        |
| SteelSteel                          | 0        | 11       | 0             | 4        | 0         | 0        | 0        | 0        | 0         | 0           | 0        | 0        |
| Unallocated                         | 0        | 0        | 0             | 0        | 0         | 0        | 0        | 0        | 1         | 1           | 2        | 2        |
| Less: Intersegment                  | 0        | 0        | -2            | -2       | -6        | -10      | -11      | -3       | -17       | -19         | -20      | -13      |
| Profit before Tax & Int             |          |          |               |          |           |          |          |          |           | Amount      | Margin % | Growth % |
| Mining                              | 53%      | 13%      | 40%           | 16%      | 31%       | 21%      | 22%      | 13%      | 38%       | 43%         | 44%      | 48%      |
| Ferroalloys & PowerFerroalloys & Po | %        | %        | -30%          | 4%       | 8%        | 0%       | -10%     | -20%     | -12%      | -2%         | 11%      | -8%      |
| Services                            | 72%      | %        | %             | %        | %         | %        | %        | %        | %         | %           | %        | %        |
| Ferroalloys/Sponge Iron             | 32%      | %        | %             | %        | %         | %        | %        | %        | %         | %           | %        | %        |
| SteelSteel                          | -33%     | -7%      | -375%         | -35%     | -100%     | %        | %        | %        | %         | %           | %        | %        |
| Unallocated                         | 0%       | 18,040%  | %             | %        | %         | 0%       | 0%       | 0%       | 0%        | 0%          | 0%       | 0%       |
| Capital Employed                    |          |          |               |          |           |          |          |          |           |             | Amount   | ROCE %   |
| Mining                              | 598%     | 244%     | %             | 116%     | 198%      | 175%     | %        | %        | %         | %           | %        | 462%     |
| Ferroalloys & PowerFerroalloys & Po | %        | -0%      | -2%           | 1%       | 2%        | 0%       | -5%      | -7%      | -9%       | -2%         | 11%      | -3%      |
|                                     |          |          |               |          |           |          |          |          |           |             |          |          |

## **Quick Financials**

| andur Manganese Ch              | nart Analys   | is Peers       | Quarters             | Profit & Lo   | oss Balance                               | Sheet    | Cash Flow            | Ratios Ir   | nvestors D   | ocuments       |               |          |            |
|---------------------------------|---------------|----------------|----------------------|---------------|---|----------|----------------------|-------------|--|----------------|---------------|----------|------------|
| Profit & Los Standalone Figures | <b>S</b> 90Cr | over was 350 C |                      |               | e years as the ind<br>d initially there w |          |                      | to illiegal | Revival starts fr<br>At full production<br>iron ore prices |                |               |          |            |
|                                 | Mar 2009      | Mar 2010       | Mar 2011             | Mar 2012      | Mar 2013                                  | Mar 2014 | Mar 2015             | Mar 2016    | Mar 2017   | Mar 2018       | Mar 2019      | Mar 2020 | TTM        |
| Sales +                         | 428           | 287            | 349                  | 181           | 161                                       | 300      | 295                  | 222         | 434  | 608            | 702           | 592      | 524        |
| Expenses +                      | 195           | 248            | 209                  | 156           | 134                                       | 248      | 269                  | 223         | 343  | 442            | 478           | 396      | 378        |
| Operating Profit                | 232           | 40             | 139                  | 25            | 27  | 52       | 25                   | -1          | 91   | 166            | 224           | 195      | 146        |
| OPM %                           | 54%           | 14%            | 40%                  | 14%           | 17%                                       | 17%      | 9%                   | -0%         | 21%  | 27%            | 32%           | 33%      | 28%        |
| Other Income                    | 3             | 15             | 10                   | 13            | 23  | 15       | 3                    | 0           | 9  | 11             | 19            | 6        | 7          |
| Interest                        | 0             | 2              | 2                    | 0             | 2   | 0        | 2                    | 0           | 7  | 5              | 6             | 7        | 7          |
| Depreciation                    | 10            | 10             | 11                   | 11            | 11  | 9        | 5                    | 4           | 7  | 7              | 13            | 19       | 19         |
| Profit before tax               | 225           | 43             | 136                  | 27            | 36  | 58       | 21                   | -5          | 85   | 165            | 224           | 175      | 128        |
| Tax %                           | 34%           | 32%            | 33%                  | 68%           | 11%                                       | 34%      | 32%                  | -189%       | 35%  | 35%            | 34%           | 16%      |            |
| Net Profit                      | 147           | 29             | 92                   | 8             | 33  | 38       | 14                   | -14         | 56   | 107            | 147           | 147      | 115        |
| EPS in Rs                       | 167.84        | 32.83          | 103.98               | 9.70          | 37.16                                     | 43.34    | 15.80                | -0.00       | 63.67  | 121.74         | 168.42        | 168.44   | 128.47     |
| Dividend Payout %               | 2%            | 9%             | 5%                   | -0%           | -0%                                       | 7%       | 18%                  | -18%        | 8%   | 6%             | 4%            | 4%       |            |
| Compounded Sa                   | les Growth    |                |                      | nded Profit ( |   |          | Stock Price          | CAGR        |  |                | ırn on Equity |          |            |
| 10 Years:                       |               | 7%             | 10 Years:            |               | 18%                                       |          | 10 Years:            |             | 2%   | 10 Ye          |               |          | 14%        |
| 5 Years:<br>3 Years:            |               | 15%<br>11%     | 5 Years:<br>3 Years: |               | 58%<br>38%                                |          | 5 Years:<br>3 Years: |             | 6%<br>-13%   | 5 Yea<br>3 Yea |               |          | 16%<br>21% |
| TTM:                            |               | -25%           | TTM:                 |               | -21%                                      |          | 1 Year:              |             | 14%  | Last           |               |          | 19%        |

## Massive Capex

| screener                | FEED           | SCREEN      | IS TO    | OLS           |             |            |            |           | Q Search  | h for a comp | any      | AYUSH V  |
|-------------------------|----------------|-------------|----------|---------------|-------------|------------|------------|-----------|-----------|--------------|----------|----------|
| Sandur Manganese Chart  | Analysis       | Peers       | Quarters | Profit & Loss | Balance She | et Cash Fi | low Ratios | Investors | Documents |              |          |          |
| Balance Shee            | et             |             |          |               |             |            |            |           |           |              | ORPORATE | ACTIONS  |
| Standalone Figures in F | Rs. Crores / \ | View Consol | idated   |               |             |            |            |           |           |              | ORPORATE | ACTIONS  |
|                         | Mar 2009       | Mar 2010    | Mar 2011 | Mar 2012      | Mar 2013    | Mar 2014   | Mar 2015   | Mar 2016  | Mar 2017  | Mar 2018     | Mar 2019 | Mar 2020 |
| Share Capital +         | 9              | 9           | 9        | 9             | 9           | 9          | 9          | 9         | 9         | 9            | 9        | 9        |
| Reserves                | 179            | 205         | 292      | 300           | 333         | 368        | 379        | 362       | 423       | 521          | 695      | 831      |
| Borrowings              | -0             | -0          | -0       | -0            | -0          | -0         | -0         | -0        | -0        | -0           | -0       | 400      |
| Other Liabilities +     | 136            | 158         | 180      | 149           | 119         | 109        | 115        | 106       | 136       | 127          | 159      | 223      |
| Total Liabilities       | 324            | 372         | 481      | 458           | 461         | 486        | 503        | 476       | 568       | 657          | 862      | 1,462    |
| Fixed Assets +          | 80             | 73          | 86       | 81            | 75          | 67         | 74         | 78        | 83        | 123          | 260      | 306      |
| CWIP                    | 4              | 7           | 8        | 5             | 18          | 4          | 4          | 1         | 3         | 12           | 202      | 557      |
| Investments             | 89             | 111         | 148      | 169           | 191         | 196        | 209        | 175       | 247       | 303          | 65       | 57       |
| Other Assets +          | 150            | 181         | 239      | 203           | 177         | 220        | 216        | 222       | 235       | 220          | 335      | 541      |
| Total Assets            | 324            | 372         | 481      | 458           | 461         | 486        | 503        | 476       | 568       | 657          | 862      | 1,462    |
|                         |                |             |          |               |             |            |            |           |           |              |          |          |

# SMIORE NEXT – Why?

## Why venturing into manufacturing led business from mining led?

- To reduce power cost
- To create captive use of iron ore

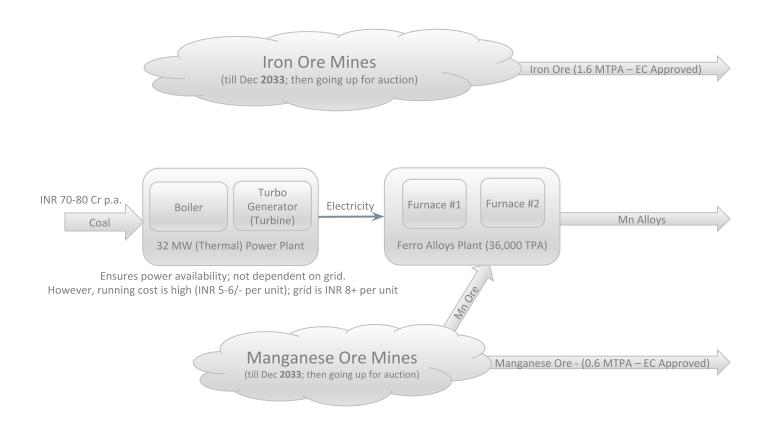
## Create captive use of iron ore

- Mines are going to go up for auction in Dec 2033
- Premium will be paid for these mines in future, going by history data of mine auctioning in KN
- View that preference will be given to cos who has captive consumption
- Reserves are not going to get over in 2033 the way the co has been mining
- Co know these mines well

### Reduce power cost

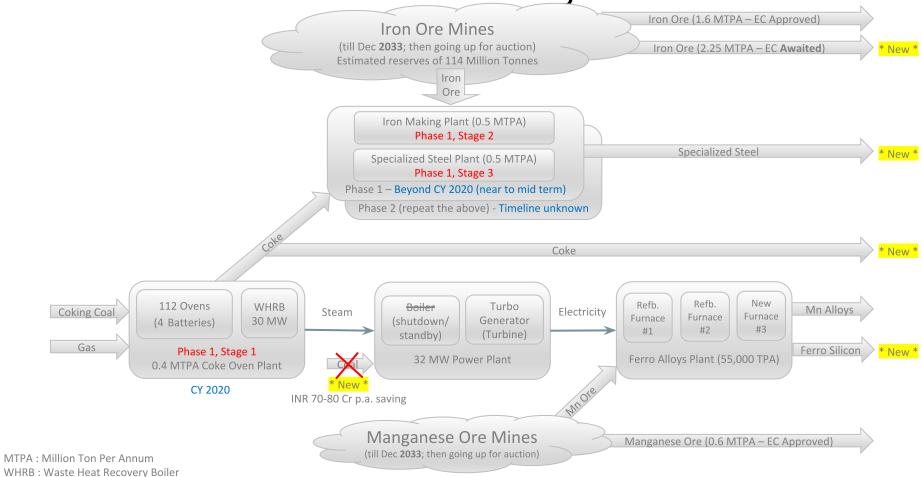
- Thinking: Set up a business which in worst case can sustain on its own
- Decided to go with non-recovery coke own plant as it can support 30 MW power generation
- Running cost of power will be down to 50p vs INR 5-6/- per unit currently
- Post 2033, even if co has to end up buying manganese ore to run ferro alloys plant, co will be cost effective

## SMIORE - In 2019



MTPA: Million Ton Per

SMIORE NEXT - 2020 & beyond

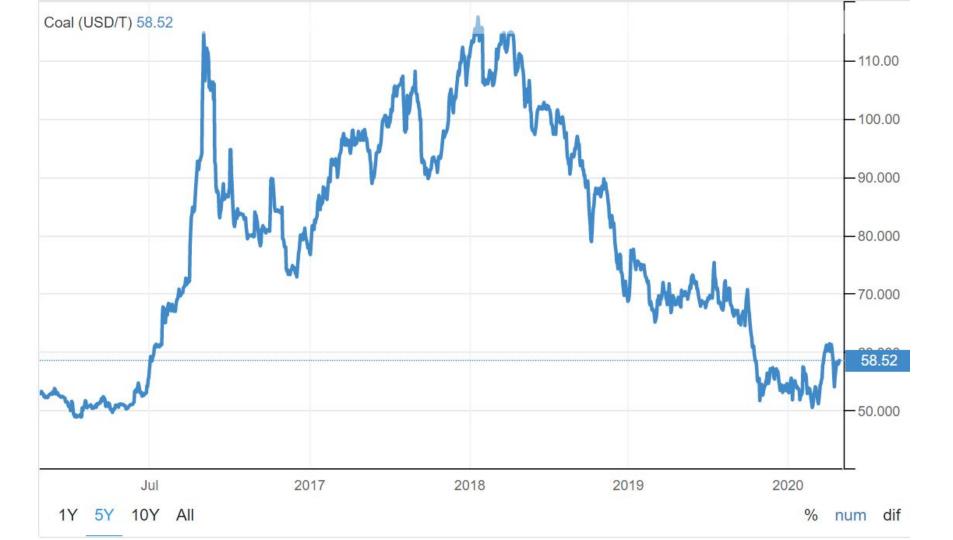


# Potential triggers

- Approval of iron mining upto 3.85 MTPA (current clearance: 1.6 MTPA) Required for the 1 MTPA steel plant. Can track progress at
  <a href="http://environmentclearance.nic.in/timelineA.aspx?pid=IA/KA/MIN/90857/2019&type=TOR&proposal\_id=19614">http://environmentclearance.nic.in/timelineA.aspx?pid=IA/KA/MIN/90857/2019&type=TOR&proposal\_id=19614</a>
- Coke oven plant- setting up 2 waste heat recovery-based (WHRB) power plant which should make their ferro alloy business profitable.
  - Heat is the main product
  - Coke is the by-product. Can generate 8-10% EBITDA.
- Increased Ferro Alloy Production- producing around 30,000 MT of Silico Manganese for the last two years, they plan to increase this to 55,000 MT.
- Increased Mn Ore Production- mining around 0.29 MTPA of Mn Ore for the last 2 years, the company plans to take this up to 0.5 MTPA.

## Risks

- 1. Is not backward integrated and has to procure coking coal which exposes it to foreign currency exchange risk
- 2. Very large debt funded CAPEX in a cyclical downturn can kill the company
- 3. Too young a MD can he mess up? Will this deter interest amongst investors?
- 4. Political interference (was congress affiliated in the past);
- 5. Large contingent liabilities because of disputed income tax and forest development tax claims (Paid 113 cr. to forest department in 2005)
- 6. Karnataka iron ore prices can sometimes be de-linked from international prices because exports are/were not allowed
- 7. Promoter pledge for the term loans (non-market linked pledge)

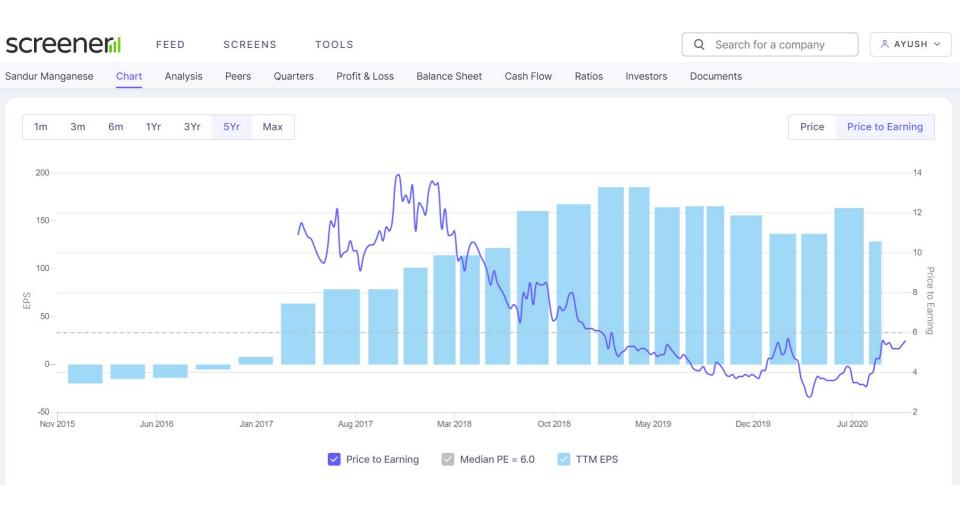


## Possible nos in FY22?

|                     | FY19    | FY20 | FY22E   |
|---------------------|---------|------|---------|
| Sales               | 687     | 580  | 1580    |
| EBITDA              | 224     | 195  | 400-500 |
| PBT                 | 224     | 175  | 300-400 |
| PAT                 | 147     | 147  | 220-300 |
|                     | Break-u | р    |         |
| Iron Ore            |         |      |         |
| Volume (MT)         | 1.49    | 1.54 | 3       |
| Sales (cr)          | 319     | 335  | 630     |
| Mn Ore              |         |      |         |
| Volume (MT)         | 0.26    | 0.22 | 0.35    |
| Sales (cr)          | 165     | 137  | 210     |
| Ferro Alloy         |         |      |         |
| Volume ('000 Tonne) | 32.7    | 19.3 | 50.0    |
| Sales (cr)          | 203     | 108  | 285     |
| Coke Oven           |         |      |         |
| Volume (MT)         | nil     | nil  | 0.35    |
| Sales (cr)          | nil     | nil  | 665     |

<sup>\*</sup>Sales realisation may vary and with that, so will the revenues and profitability. Estimates are taken based on last 3-4 year average figures.

# Update from AGM 2020



# Interesting facts

- Produces lower grade of manganese which is used to make ferro alloys that is used in making steel. This grade of steel is used in automobile. Higher-grade of manganese is used in dry cell which can be used in electric vehicles. High-grade manganese ores are exported to China, where they are used to produce manganese metal & dry cells.
- Demand for India in terms of manganese ore is ~3MT. 1/3rd to half the demand is mined locally in India whereas the rest of manganese ores are imported
- Iron ores are of lower grade (therefore lower price realization) in the form of fines used in blast furnace based steel plants and cannot be exported (NMDC has higher quality iron ores)
- Has ~2000 ha of mining land with overall estimated iron ore reserves of 114 MT
- Withdrawal of concessional power tariff by Karnataka government bankrupted the company in 1990s
- Peak earnings are 5-years apart (Sept 2009, Jan 2014, Feb 2019).
- Low cycle (ROE < 10%, PAT margins < 4%, Trailing sales growth is -ve); Peak cycle (ROE > 30%,
   PAT margins > 20%)

# Family tree

#### Founders:

Y.R. Ghorpade (Yeshwantrao Hindurao Ghorpade) (1908 -1996) - Ruler of Sandur

M.Y. Ghorpade (Murarirao Yeshwantrao Ghorpade) (1931 - 2011) - Eldest son of Y.R. Ghorpade - Ruler of Sandur

\_\_\_\_\_

**Ajaisinh Murarao Raje Ghorpade** - Eldest son of M. Y. Ghorpade - Now Ruler of Sandur **Bahirji Ajaysinh Raje Ghorpade** - Eldest son of Ajaisinh Murarao Raje Ghorpade - **became the new MD of SMIORE now** He is the next eligible ruler from the royal family. Inducted on Board in 2015 at the age of 20 to gain experience.

Refer: <a href="https://www.royalark.net/India2/sandur5.htm">https://www.royalark.net/India2/sandur5.htm</a> 3

#### How can audience help?

- Do more work and share inputs that validate or break the hypothesis
- Do work around cos producing Coke are there examples of substantial saving by way of WHR? Why haven't others done this before?

# For Offline Reading

Table 5.2: Details of various non-recovery coke oven batteries operating in India

| SI.No | Company Name                | Place          | Capacity<br>in Million<br>ton | No. of<br>Batteries | No. of<br>Ovens | Quenching | Туре       |
|-------|-----------------------------|----------------|-------------------------------|---------------------|-----------------|-----------|------------|
| 1     | Bhatia Coke                 | Chennai        | 0.20                          | 4                   | 157             | Wet       | Horizontal |
| 2     | Sathavana Ispat             | Bellary        | 0.40                          | 6                   | 90              | Wet       | Horizontal |
| 3     | Visa Suncoke                | Jajpur         | 0.40                          | 8                   | 88              | Wet       | Horizontal |
| 4     | Electrosteel                | Bokaro         | 0.50                          | 4                   | 140             | Wet       | Vertical   |
| 5     | Bhushan Steel &<br>Power    | Jhasruguda     | 0.50                          | 8                   | 96              | Wet       | Horizontal |
| 6     | Hoogly Met coke             | Haldia         | 1.60                          | 4                   | 352             | Wet       | Horizontal |
| 7     | Bengal energy               | Khragpur       | 0.60                          | 4                   | 160             | Wet       | Horizontal |
| 8     | Jindal saw ltd              | Mundra         | 0.40                          | 4                   | 197             | Wet       | Horizontal |
| 9     | Gujarat NRE Coke<br>Itd     | Dharwad        | 0.59                          | 32                  | 320             | Wet       | Horizontal |
| 10    | Gujarat NRE Coke<br>Itd     | Bhachau        | 0.30                          | 14                  | 260             | Wet       | Horizontal |
| 11    | Jai Balaji                  | Durgapur       | 0.36                          | 4                   | 88              | Wet       | Horizontal |
| 12    | Tata Metaliks               | Kharagpur      | 0.20                          | 12                  | 2               | Wet       | Horizontal |
| 13    | Usha Martin Ltd             | Jamshedpur     | 0.40                          | 2                   | 96              | Wet       | Horizontal |
| 14    | JSPL                        | Raigarh        | 0.80                          | 8                   | 176             | Wet       | Horizontal |
| 15    | JSW Steel Ltd               | Salem          | 0.50                          | 3                   | 120             | Wet       | Horizontal |
| 16    | JSW Steel Ltd               | Bellary        | 1.20                          | -                   | 0               | Wet       | Horizontal |
| 17    | Sesa Goa                    | Goa            | 0.6                           | (4)                 | 7-              | Wet       | Horizontal |
| 18    | Jaiswal Nicco               | Raipur         | 0.2                           | 140                 | 14              | Wet       | Horizontal |
| 19    | Lanco Industries            | Khalaghasi     | 0.20                          | 4                   | 162             | Wet       | Horizontal |
| 20    | Gerdau Steel                | Tadipatri      | 0.2                           | 2                   | 44              | Wet       | Horizontal |
| 21    | Haldia coke &<br>Power      | West<br>Bengal | 0.12                          | -                   |                 | Wet       | Horizontal |
| 22    | Basudha Udyog               | Chennai        | 0.12                          | -                   | -               | Wet       | Horizontal |
| 23    | BLA Industries              | Mithapur       | 0.18                          | 127                 | 12              | Wet       | Horizontal |
| 24    | Maha Shakti Coke            | Gujarat        | 0.85                          | - 2                 |                 | Wet       | Horizontal |
| 25    | Austral coke & projects ltd | Gujarat        | 0.24                          | 127                 |                 | Wet       | Horizontal |

Table 5.5: Details of Working Regime of Coke Oven with CDQ

| Description                                       | Unit   | 25.00     | roduction<br>pacity |
|---|--------|-----------|---------------------|
|   |        | SMIORE    | JSW                 |
| 1   | 2      | 3         | 4                   |
| Coke Oven Capacity                                | MTPA   | 0.4       | 3.4                 |
| Total Nos. of Ovens                               | Nos.   | 112       | 512                 |
| Coking time                                       | hours  | 36        | 24                  |
| Nos. of pushing per hour                          | Nos.   | 2.7       | 21                  |
| Nos. of Oven Pushed per day                       | Nos.   | 65        | 512                 |
| Weight of coal charge into one oven               | tons   | 25        | 25                  |
| Coke produced from one Oven                       | tons   | 18        | 18                  |
| Coke Production / pushed per hour                 | tons   | 48        | 380                 |
| Hot coke charged in CDCP per hour                 | tons   | 48        | 380                 |
| Temperature of coke charged in the chamber        | °C     | 1050      | 1050                |
| Temperature of coke after cooling                 | °C     | < 200     | < 200               |
| Temp. of inert gas at entry of cooling chamber    | °C     | < 180     | < 180               |
| Temp. of circulating gas before waste heat boiler | °C     | 750 – 800 | 870-950             |
| Circulating gas flow rate                         | Nm³/hr | 81,000x1  | 1,80,000 x 4        |
| Thermal efficiency                                | %      | 80 - 85   | 80 - 85             |
| Pressure of steam generated                       | ata    | 66        | 80                  |
| Temperature of steam generated                    | °C     | 500       | 510                 |
| Generation of steam/ boiler                       | t/h    | 25        | 65 x 2<br>75 x 2    |
| Capacity of cooling chamber                       | t/h    | 52 - 56   | 90 - 95             |
| Time of coke cooling in chamber                   | h      | 2 - 2.5   | 2-2.5               |
| SP Steam Consumption Per Mw                       | t      | 4         | 4                   |
| Power generation per hour                         | MW     | 6         | 70                  |
| Auxiliary power consumption per hour              | MW     | 0.6       | 7                   |
| Net power generation                              | MW     | 5.4       | 63                  |