2022 SEAISI Technology Country Report - Singapore

15 Nov 2022 Malaysia, Kuala Lumpur

Basic Information

Country:	**Singapore**
Company:	NatSteel Holdings Pte Ltd
Total steel production:	650,000mt
Product range and quantities covered:	-Rebar, Wire Rod, Mesh, CAB, Prfab Cages
Planned top 3 projects (on benefit or value) for the coming years:	1. Roof Top Solar Panel 2. Fume Extraction System Revamping 3. MES Upgrading
Key areas of R&D focus	- Steel Slag Recycling
Most interesting technical process	- Modification of tempcore box nozzles to improve yield strength.
Manufacturing improvement team	Yes. We have a Technology Department to drive technology and sustainability improvement projects.
Proposals for new projects for TechCo to be considered.	Explore the use of hydrogen to replace tradition fuel source.

TECHNOLOGY – Process Improvement, Energy Efficiency and Product Design/Development

ITEM	STEELMAKING	ROLLING MILL
Energy savings	Process Optimization in EAF Upgrade cooling water system	Level 2 optimisation for Reheating Furnace control. Conversion of fuel oil to diesel. Upgrade cooling water system
Process development	Sequence Optimization with new CNC Nozzle Changer at CCM	Quality improvement for 500E product.
Other Topics	MES revamping using Ignition software	MES revamping using ignition software

NatSteel's Footprint

- Established in 1961 as the **National Iron and Steel Mills** to primarily serve the construction industry
- Offers a wide range of products & established a strong presence in SEA

	Market Segment	Rebar	Wires/ Wire Rod	Cut & Bend	Welded Mesh	Pre-Fabricated Cages
NatSteel Singapore	Construction	✔	✔	✔	✔	✔
Eastern Steel Services	Construction	✔	✔	✔	✔	

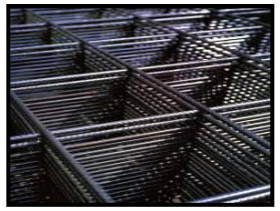
NatSteel in Singapore

Easteel Services in Malaysia

Rebars

Wire Rod

Cut & Bend

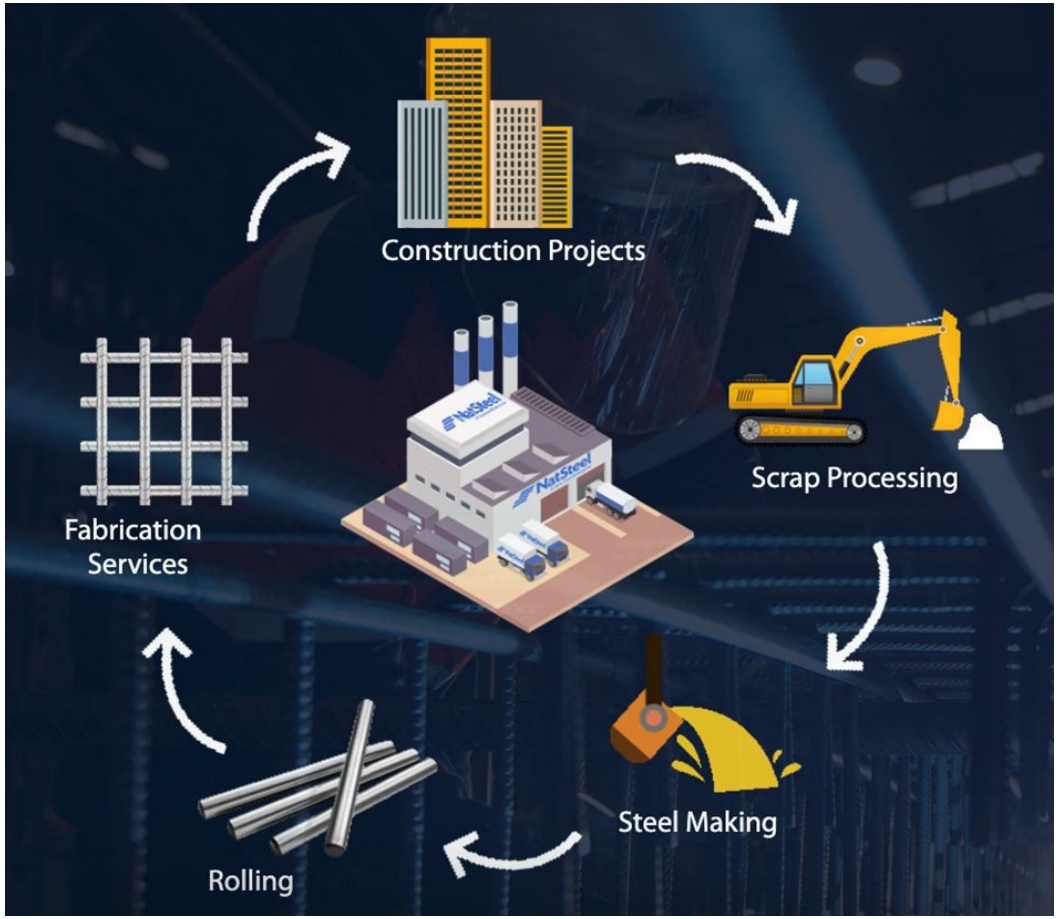


Welded Mesh

Bored Pile

Pre-Fabricated Cages

NatSteel's Steel Making in a Circular Economy



Largest Scrap Recycler/Consumer in Singapore

- Recycles ~50% of scrap generated in Singapore
- Automated and modern scrap shearing facilities

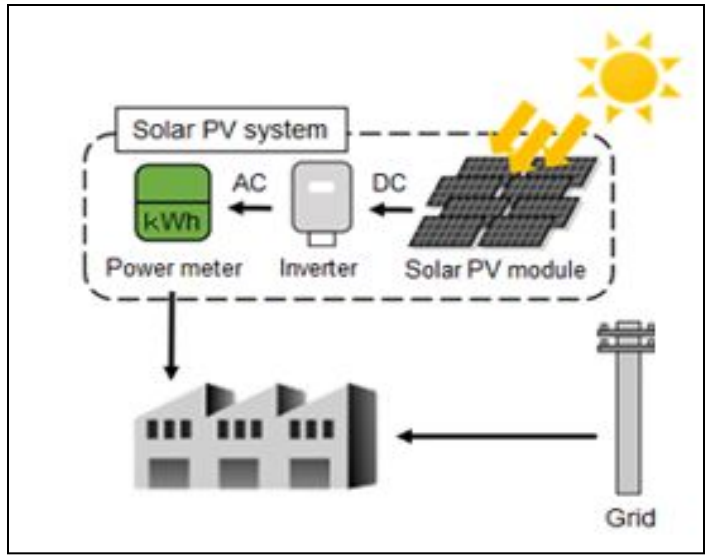
Steelmaking & Rolling Mill

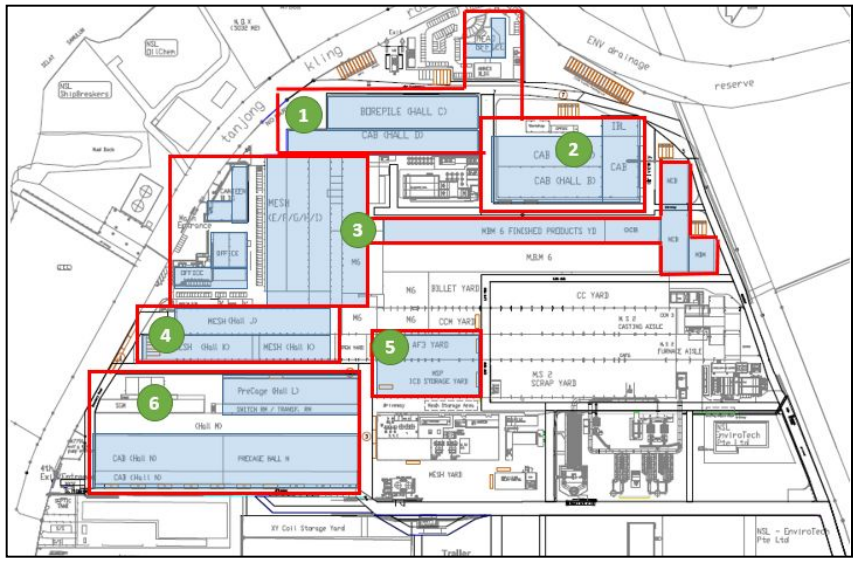
- One of the Most Energy Efficient Electric Arc Furnace in the World

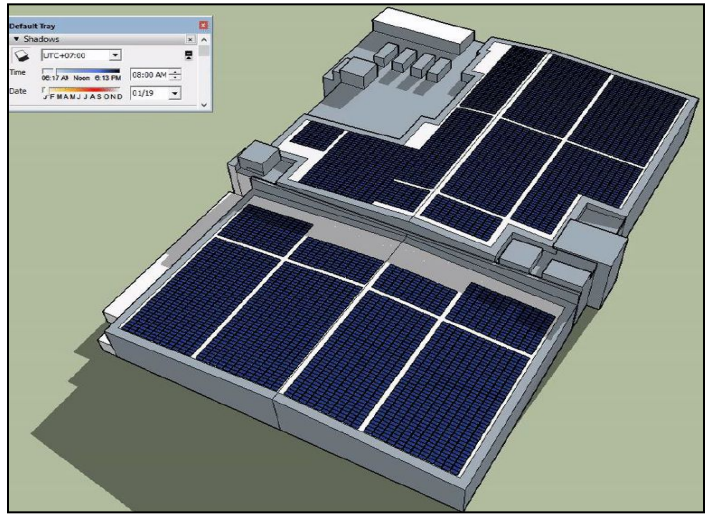
Smart Reinforcement Solutions

- 600 kmT annual capacity
- One of the world's single largest fabrication centre

Upcoming Projects – Rooftop Solar Panels







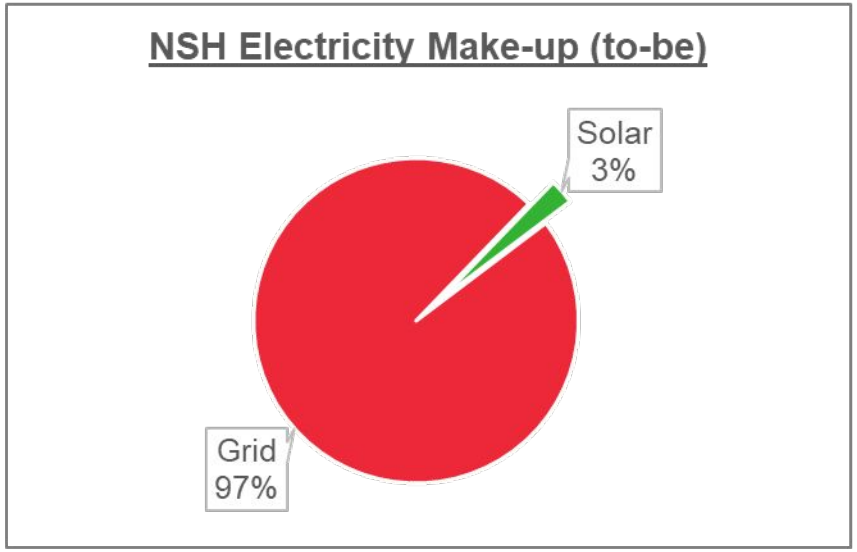
8.6GWh/yr* green & free electricity

6zones covering 37,000 sqm roof area

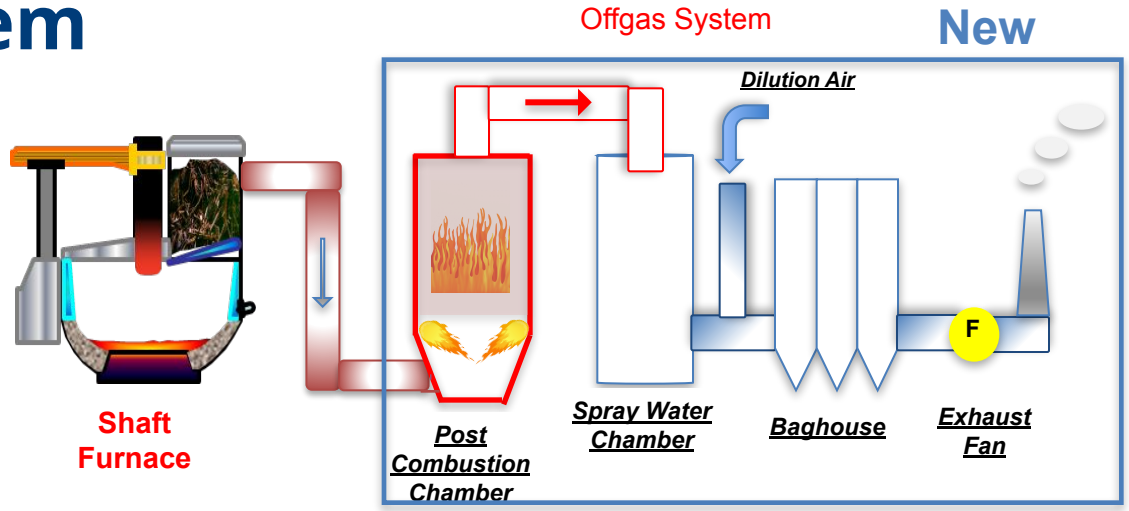
25years system life

3% of total site consumption

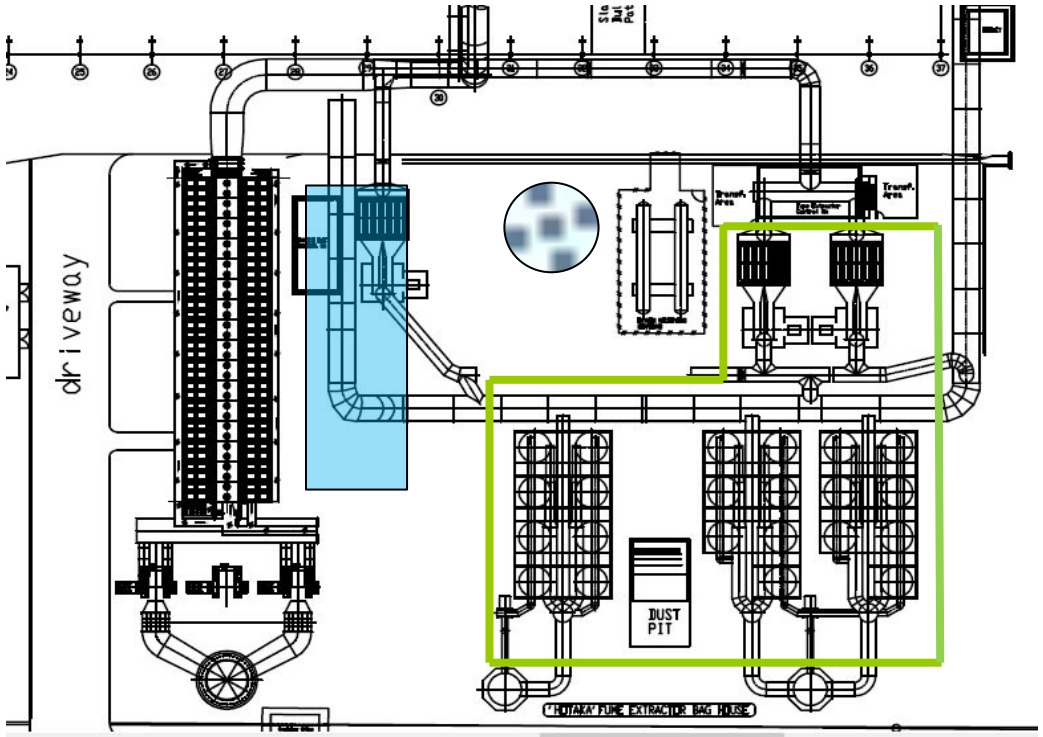
Means 100% of generation will be consumed by NatSteel



Upcoming Projects – Revamp Fume Extraction System



Post Combustion System



New Baghouse

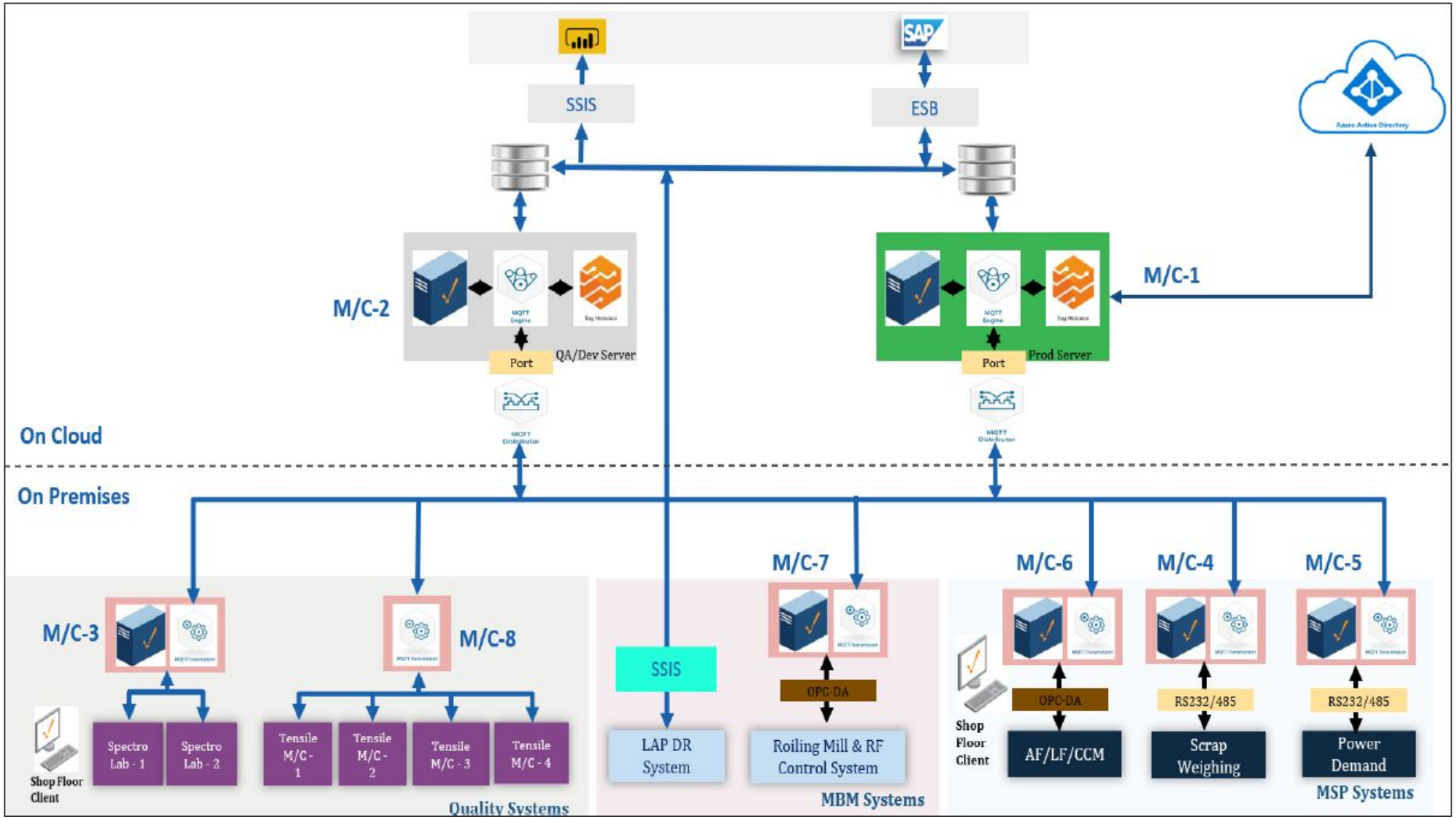
Quenching Tower (Spray Cooling Chamber0

Proposed Baghouse

Old Baghouse to be removed

- 2600m2 of area to be freed after removal of old baghouse.
- Estimated energy savings – **1MW**

Upcoming Projects – MES Upgrading



Environmental Sustainability

Our carbon footprint is best in class in the geographies we operate in, and our long term decarbonization roadmap is aligned with national commitments

Climate Change

Key Enablers

Modern Scrap Recycling Facility

Changing from HSFO to a more environmentally friendly fuel

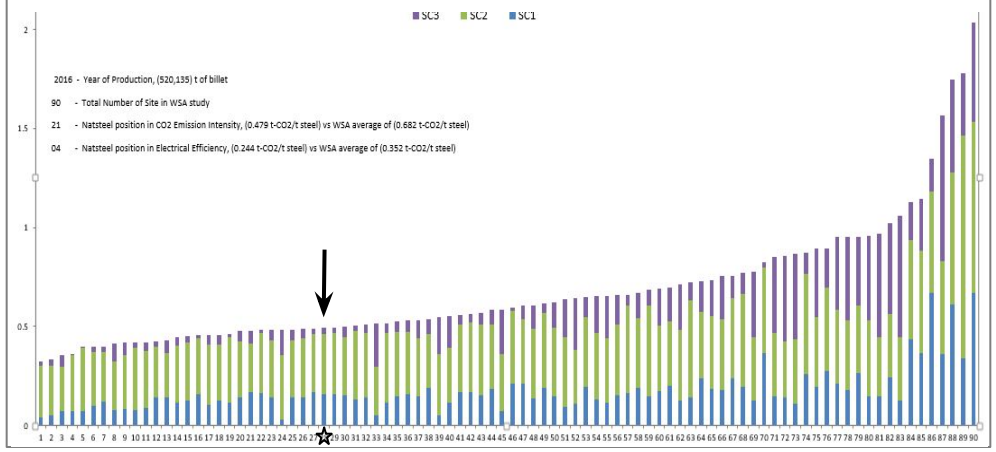
Performance Over the Years

Singapore 2020 Waste Statistics and Overall Recycling

Waste Type	Total Generated ('000 tonnes)	Total Recycled ('000 tonnes)	Recycling Rate	Total Disposed ('000 tonnes)
Ferrous metal	934	930	99%	4
Used slag	106	104	99%	2

(Source: National Environment Agency Singapore)

Natsteel is ranked 28rd (1st quartile of the best performance) amongst EAF for the Co2 emission



- NatSteel is the largest metal recycler in Singapore: Recycles 50% of scrap generated
- Contributes to 99% recycling rate of Ferrous metal and Used slag in Singapore
- Recognised by WorldSteel as one of the lowest CO2 Emissions amongst EAFs

CLIMATE ACTION Member
worldsteel ASSOCIATION
10-year member recognition

Worldsteel Association
Climate Action Star Member

Environmental Sustainability

Resources Management

Key Enablers

Pre-heating technology, Revamp Fume Extraction System

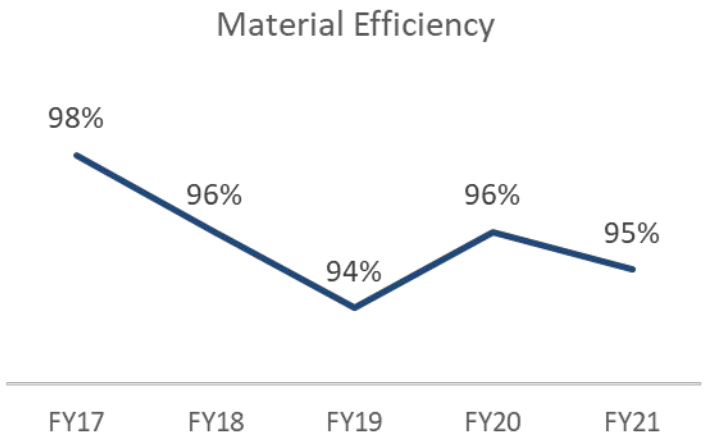
Upgrading of Cooling Tower

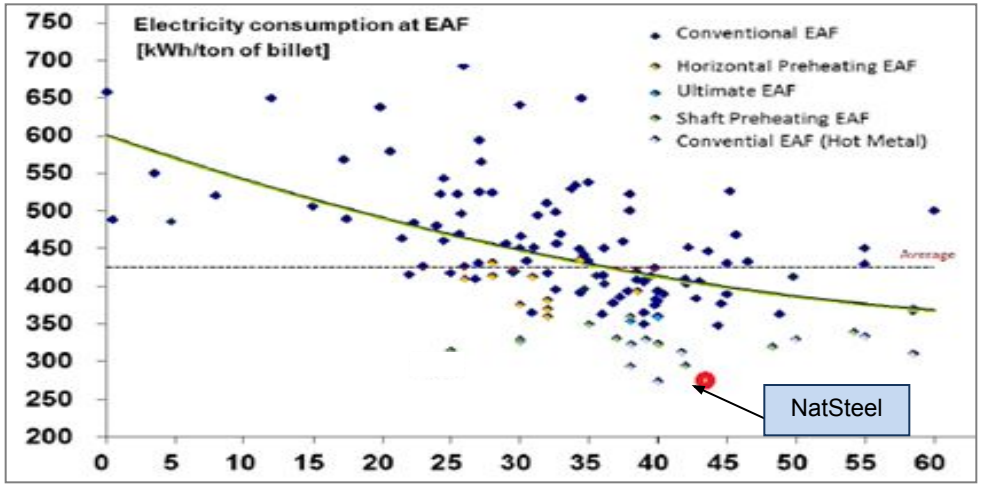
Switching to NeWater

Emission Sources are mapped and monitored

Process improvements can then be identified and implemented with the goal of reducing emissions.

Performance Over the Years





Our plant had successfully switched from PUB potable water to NeWater for all the major process related use.

Material efficiency maintains between 94% to 95% for the past three years

Air quality is measured according to the Ringelmann Chart standard.

TÜV SÜD ISO 50001

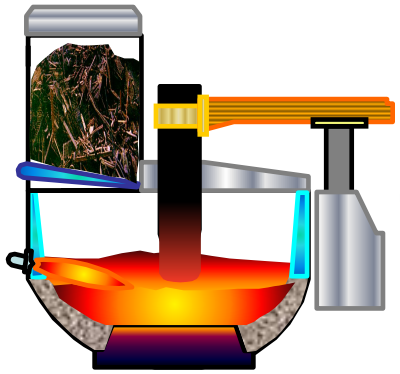
Energy Management System

ISO 50001

Research Projects – Steel Slag Recycling

NatSteel

Current



Electric Arc Furnace

Steel Slag

Slag Processing Plant

Asphalt Mixture for Roads

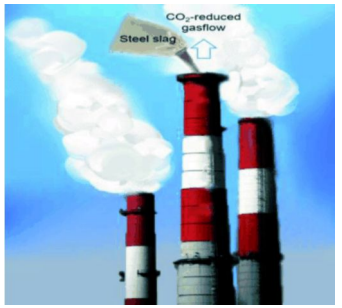
Opportunities

Agriculture

Concrete Material

Calcium Recovery

CO2 Sequestration



Steel slag of 100 g can sequester more than 12 g of CO2 within a few hours

THANK YOU