Sustainable Steelmaking: Infrastructure for the Future

Taryn McQuinn (Beca Environmental) & Claire Jewell (NZ Steel)

NZSSES Conference 2010: Transitions to Sustainability




Sustainable Steelmaking

- United Nations World Commission on Environment and Development 1987
  - *"development which meets the needs of future generations without compromising the ability of future generations to meet their own needs"*
- Many 'good business practices' now termed 'sustainable initiatives'
- NZ Steel engaging in the debate
- World Steel Association's 'Sustainability Indicators'

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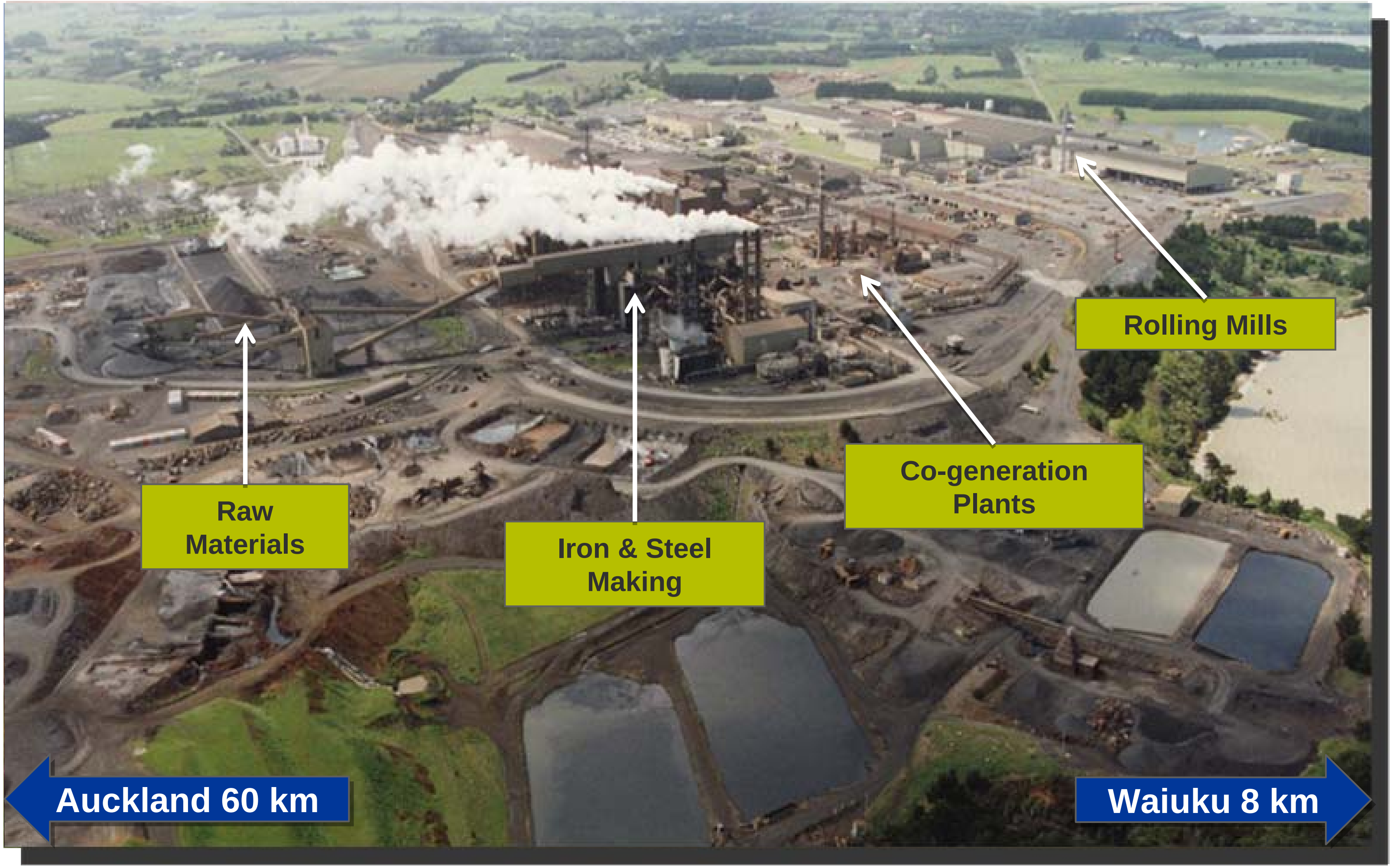
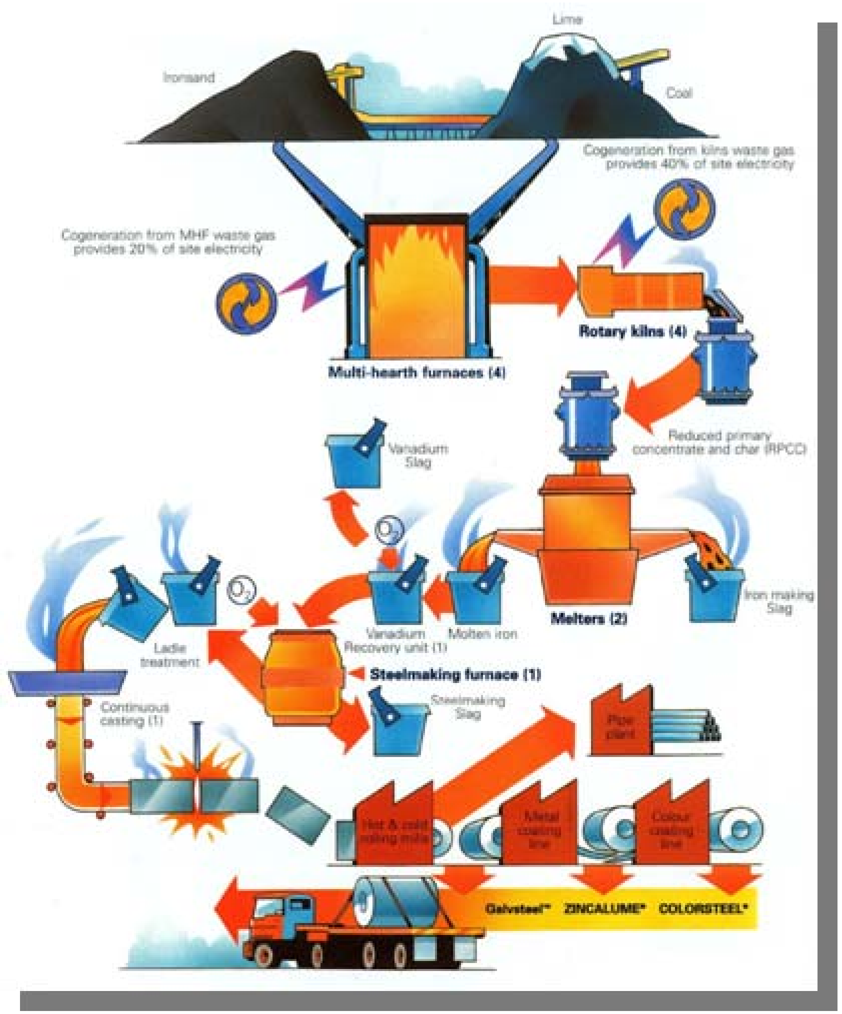
About New Zealand Steel



The Steelmaking Process



- Uses local raw materials
  - Ironsand (titanomagnetite) used as primary concentrate (PC) for ironmaking process
  - Lime
  - Coal
  - Around 12% recycled steel content

A Unique Steelmaking Facility

- Ironsand vs. iron ore or scrap
- ‘Boutique’ facility on production volumes
- Mining operations
- Utilities and water supply
- Specific issues for waste and energy intensity

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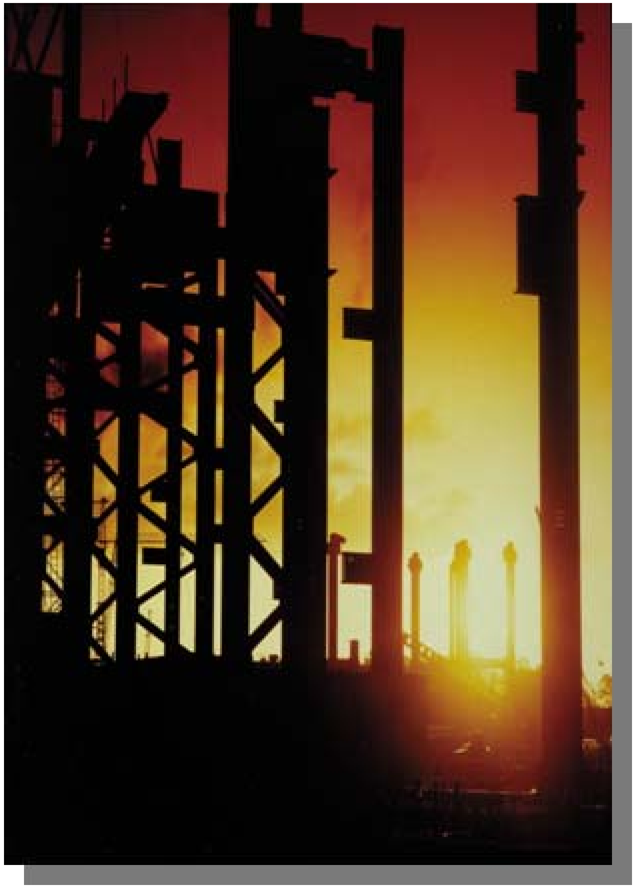
Frameworks for Sustainability

- Business in New Zealand slow to implement sustainable practices
- NZ Steel's framework of 'sustainable practices'
  - A commitment to the design and installation of controls
  - ISO 14001 Management System
  - Business Improvement Process
  - Supply chain management protocols
  - A commitment to innovative product design



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Key Achievements

Waste Minimisation & Recycling

Wastewater Treatment Facilities

~98% Water Reuse of Site Water

Monitoring Wastewater Discharge

Monitoring of Environment Quality

Stormwater Reticulation & Recycling

Millscale Reuse Project

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Case Study – Attritioner

- Problem

  Alluvial silts (clays, silica etc.) in ironsand…

  – Bound to the titanomagnetite

  – Ideally removed before fed into process

  – Adversely affects processes, consumes energy & resources

- Objective

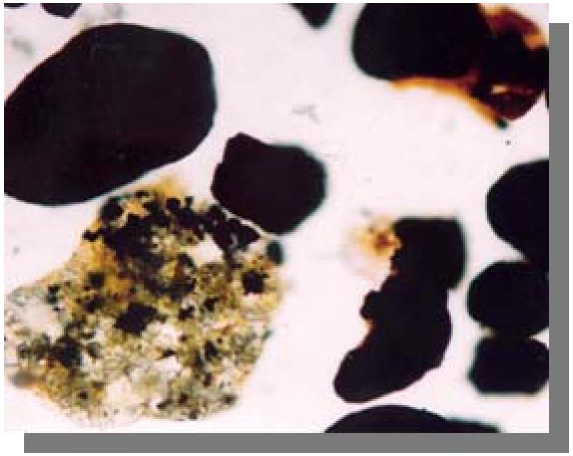
  Remove alluvial silts…

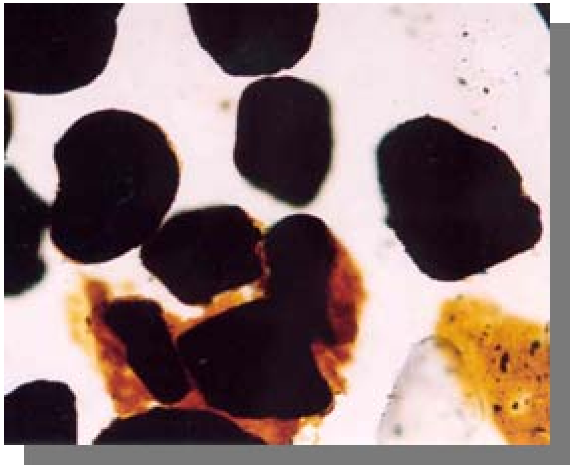
  – Reduce energy & resource consumption

  – Reduce costs

  – Reduce silt disposal

  – Manage variations in unprocessed sands





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Case Study – Attritioner cont.

- Project Description

Mechanical removal of silt from ironsand…

Cyclone: Removes water

Attritioner: Counter-current flow rubs ironsand against itself to polish silt from titanomagnetite

Washing: Removes dislodged silt

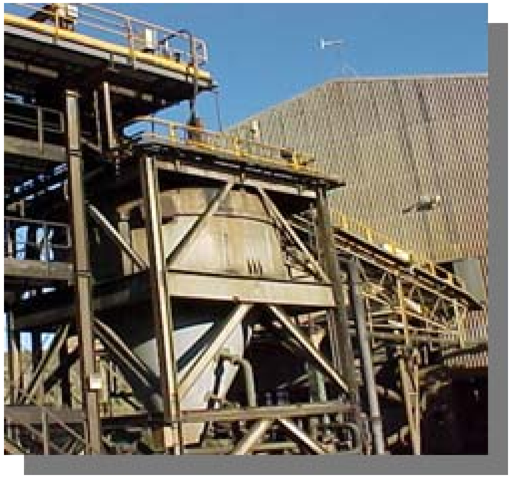
– 210 tonnes dry solids / hour

– Estimated life 20 years

- Projected Financials

– Capital Cost $3.3M

– Savings >$2.5M/year



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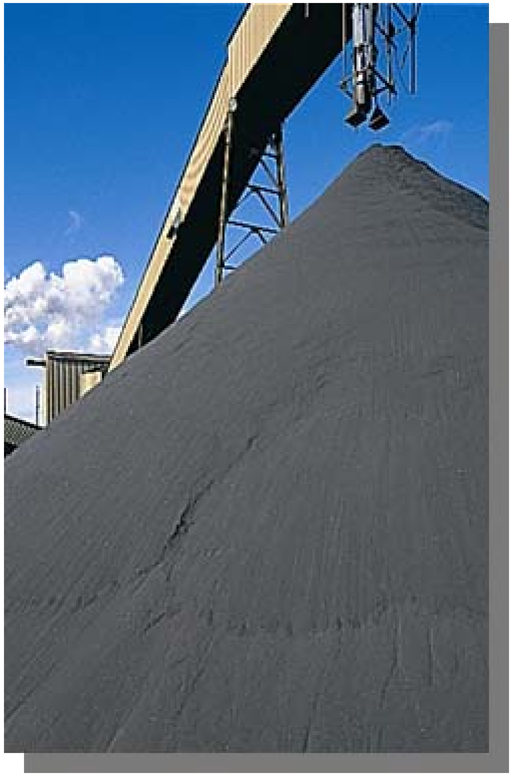
Case Study – Attritioner cont.

- Project Outcomes
  - Improvements in most areas

Objective	Before	Intended	Achieved
Reduce unbound clay proportion in PC	2.8%	1.5%.	1.5%
Reduce silica proportion in PC	2.14%	1.4%	1.2%
Reduce chemical costs for treating clays	$612K	$330K	$330K
Reduce clay disposal costs	$600K	$150K	$150K
Reduce limestone costs	*n/a**	By $285K	No Change
Reduce coal costs	*n/a**	By $1.65M	No Change



**commercially sensitive information*

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Challenges in Achieving Sustainability

- Barriers and limitations to implementing sustainability
  - Return period on investment in an aging facility
  - Increasing operational and maintenance costs
  - Available capital and distribution of investment
  - Market options for by-products / wastes
  - Economies of scale for improvement initiatives
  - Drivers to encourage resourcing / investment / cultural buy-in

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How Does NZ Steel Compare?

- World Steel Association's Environmental Sustainability Indicators
  - Tracks sustainability over time
  - Data from 33 steelmakers
  - Variable production volumes (4-6 million tpa compared to 0.6 million tpa)
  - NZ Steel contribute as part of the BlueScope Steel Group

	NZ Steel				World Steel Association		
	2006	2007	2008	2009	2006	2007	2008
Greenhouse Gas Emissions (tonnes CO_2 / tonne steel cast)	3.4	3.3	3.3	3.5	1.7	1.9	1.9
Energy Intensity (GJ / tonne steel cast)	36	35	35	37	21	18	18
Material Efficiency (% of by products reused)	89	89	76	87	97	98	98
EMS (% of employees and contractors in EMS registered production facilities)	100	100	100	100	86	85	87

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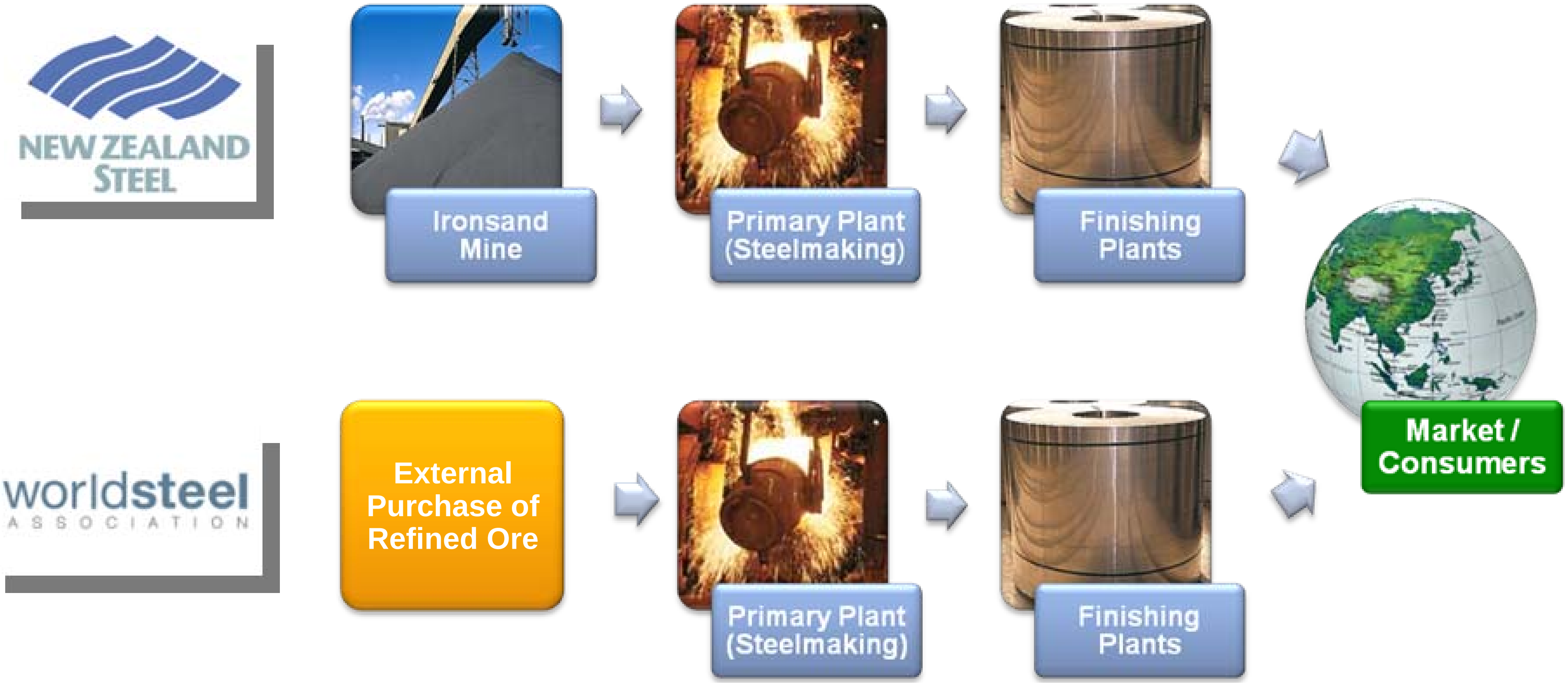
Remember NZ Steel is Unique!



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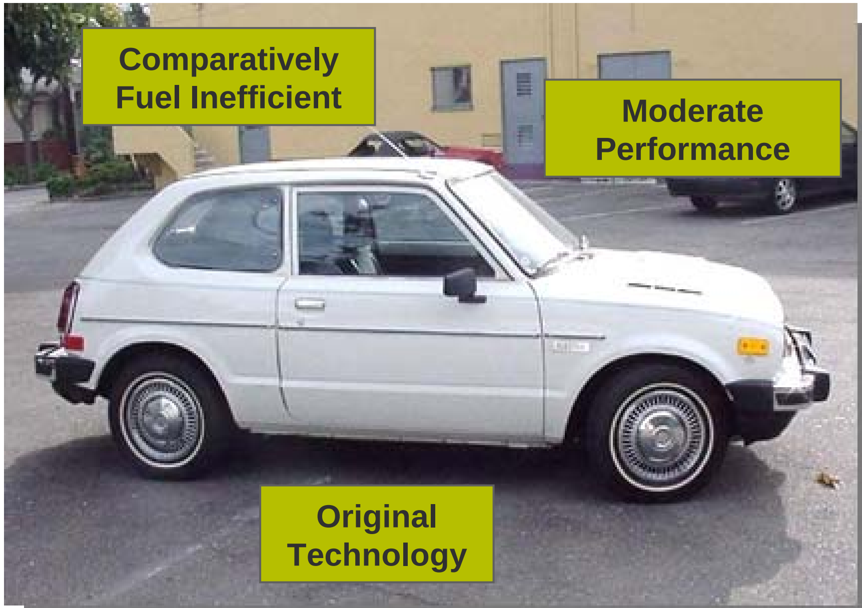
Comparable or Not?

2011 Honda Civic Vs. 1972 Honda Civic



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Where to Next?

- Sustainability a constant objective
- Further investment
- Levers for enhancing environmental performance
  - Enhance operations and installed base
  - Adjust business accounting systems to consider environmental costs
  - Undertake full lifecycle analysis
  - Optimise energy efficiency
  - Refocus decision making processes
  - Collaborative industrial development

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Summary

- Sustainability focus
- A unique process lends itself to unique issues
- NZ Steel seek to adopt & implement sustainability practices
- Recognise areas for improvement & potential initiatives
- Options for sustainability evolve over time

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