



Steel Stewardship Forum (SSF) Supply Chain Project – A Case Study

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In 2008, the SSF Steel Stewardship Forum (SSF) was formed with representatives from industry, government and NGOs in response to the APEC Ministers Responsible for Mining discussion in February 2007 that steel stewardship would make a positive contribution. This followed the Stewardship-Life Cycle Partnerships APEC meeting in Beijing, 2007, where there was encouragement for Australia to develop a steel stewardship model for APEC. A group of interested parties then met in March 2008 to that end. The formation of the SSF body was underpinned by its drive to maximise the value of steel to society, whilst minimising the negative commercial, social and environmental impact across the life cycle. The SSF body aims to develop steel stewardship across the entire steel supply chain within the Australian market and to act as a template or 'best practice' model for the region. Appendix A contains a list of SSF members.

The SSF concept brings together representatives from all major sectors of the Australian steel product life cycle from mining through steel manufacturing, processing, product fabrication, use and re-use, and recycling. The focus is the shared responsibility of working together to optimise the steel product life cycle. The process will use sustainability principles which include minimising the impact of steel on the environment and maximising its social and economic benefits. The SSF believe that, collectively, the steel industry can add value to and improve the performance of the steel industry across the whole product life cycle (SSF Business Plan, 2012).

Optimising the steel product life cycle using sustainability principles is important as steel is necessary for the functioning of the global economy, and there is a significant environmental impact arising from its production process. Ensuring a more sustainable product is seen as key to Australia's medium to long-term competitiveness within this context.

1. Context

Australia has abundant supplies of natural resources, including the second largest accessible reserves of iron ore, which is a key input in the production of steel. Due to steel's position as a material underpinning economic growth, it was appropriate that a steel stewardship operating model was developed. Currently, there is no mechanism across the Steel Supply Chain to consistently and comprehensively capture, measure, benchmark and communicate efforts on climate change, environmental programs and other sustainability indicators. Efforts are sector association or company based at present rather than as an aggregated supply chain – in other words there are attempts being made to improve sustainability of the industry but as yet there are no widely adopted mechanisms at the total supply chain level. The lack of such a process to collectively improve the entire supply chain and communicate the current and future successes restricts the steel producer's ability to report on and improve its credentials in the market and with regulators (SSF Business Plan, 2012). It is particularly important given major policy initiatives in Australia placing increasing pressure on supply chains, such as with energy efficiency.¹ The SSF framed the discussion of a Responsible Certification Scheme around a set of eight program attributes that are common to successful certification schemes (Table 1).

¹ For example, the recent introduction of the carbon pricing mechanism and the Energy Efficiency Opportunity Act 2006 Cth.

Table 1: Summary of eight program attributes of Responsible Certification Scheme

Responsible Certification Scheme Program Attributes	Definition (SSF Scoping Document, 2011)
Independence	Minimising perceived conflicts of interest through independent third party assessment
Transparency	Publicly disclosing certification criteria, how assessments are carried out, and hidden trade-offs
Clarity	Minimising customer and participant confusion by establishing product assessment criteria which clearly differentiate preferable products from others
Traceability	Implementing a chain-of-custody program to demonstrate the link between program and sustainability results/outcomes
Reassessment	Scheduling reassessment within a predefined period to build trust with participants and allow for factors such as new technologies, new products, new environmental information and market changes to be taken into account
Leadership	Establishing quantitative metrics for success and demonstrating how the program is contributing to sustainable development.
Flexibility	Accommodating participants of various sizes and place within the steel value chain
Stakeholder Engagement	Ensuring stakeholder participation and input on program development and ongoing implementation

Appendix B contains a representation of the material flows within the steel supply chain, and illustrates the complexity required in any holistic attempt to measure and manage sustainability performance.

2.1 Stakeholder perceptions of the steel industry in Australia

A key driver of the implementation of the SSF's sustainability initiative is the perception of key stakeholders that steel products are more part of the problem in relation to the environment than part of the solution. According to a World Steel Association survey conducted in 2009, covering customers, education, financial community, government, industry, industry organisations, non-government organisations (NGO's), and suppliers:

- 69% perceive steel as part of the problem when considering the challenges facing the environment globally
- 18% perceive steel as part of the solution
- 12% perceive steel as both part of the problem and part of the solution
- No customers, Non-Government Organisations (NGO's) or education professionals considered steel part of the solution
- Environmental impacts, high energy consumption and greenhouse gas emissions rated highest as causes of the problem
- Environmental issues consistently ranked the highest perceived challenge for the steel industry

2.2 Adoption of SSCM practices by the Australian Steel Industry

Creating value through the adoption of sustainable practices throughout the supply chain involves the identification of impacts and risks surrounding social, environmental, and health & safety issues in the supply chain, and then working towards improving them (Gattorna, 2010). According to extant literature, building capability around Sustainable Supply Chain Management (SSCM) can act as a competitive resource, and the collaboration between members of a supply chain can deliver competitive advantage at the inter-supply chain level (Gold, Seuring & Beske, 2010), these practices include things such as risk and safety management, impact assessment and other. Accordingly, it is critical that the steel industry supply chain develop a means of implementing SSCM initiatives and a mechanism of reporting back to stakeholders on sustainability performance; thus ascertaining what sustainable capabilities drive effective SSCM strategy, and the extent to which the adoption of SSCM assessment tools influence performance outcomes.

2.3 Understanding Sustainable Supply Chain Management (SSCM)

The Brundtland Report provided the first and most widely recognised definition of sustainable development within organisations, that is, “*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*” (WCED, 1987, Chapter 2 p. 1). Whilst sustainable development can be challenged as a set of diffuse and values-laden concepts (e.g. Jacques, 2006; Jacques, Dunlap & Freeman, 2008), it is seen as having a material impact on how companies behave and plan to behave to meet competing future needs. Issues such as climate change, the impact of unprecedented consumption, and increased population density are framing governmental and inter-governmental policymaking, with companies at the same time having to adapt along with the pressures of an ever expanding and dynamic market (Rainey, 2006; Hujsak, 2010).

Sustainability can be thought of as the goal of sustainable development, increasingly seen as a means of addressing these sometimes competing demands. In terms of what it means for business, the UTS Business School Sustainability Working Party has selected the following definition:

‘Sustainability refers to the long term, to the concept that decisions made now should not impair the quality of life for future generations. They should not erode our stores of either natural or human capital. A fully sustainable business operates to maintain and restore stocks of natural capital and to improve human and societal wellbeing.’

Sustainability in organisations can be thought of being implemented and understood according to their movement through a series of phases, ranging from non-responsiveness through to compliance, efficiency, strategic pro-activity and the ideal of the sustainable organisation (Dunphy, Griffiths and Benn, 2007) (see Appendix C). Increasingly, it is recognised that organisations alone cannot achieve such changes and are dependent upon their supply chain practices to improve their environmental, social and economic performance. Recent research on supply chain management (SCM) has focused on SSCM practices, and there is now a wide literature on the topic (e.g. Zhu & Sarkis, 2004; Seuring & Müller, 2008).

2.4 Why Does SSCM Matter?

Even though many senior managers recognise the importance of sustainable business and of the wider issues of sustainable development, knowing how to leverage and apply knowledge in search for value creation across a SSCM still remains a challenge. Not only is this knowledge often tacit (Bowen, Cousins, Lamming & Faruk, 2001), but sustainability is inherently multidisciplinary and sharing such knowledge across the chain may involve crossing disciplinary, role-based, as well as organizational boundaries (Benn & Martin, 2010).

Supply chains create immeasurable stresses on their external environmental; management is increasingly becoming accountable for processes that were previously beyond their traditional domain of control (Tebo, 2005). Today, in order to optimise product costs, adopting sustainable practices has its own challenges, these considerations demand specific considerations towards associated by-products and total life-cycle analysis from a total cost standpoint (Faisal, 2010). However, when considering total product cost, they are not void of negative externalities arising from strapped resources (Linton, Klassen & Jayaraman, 2007). Increasingly, sustainability issues in the supply chain cannot be ignored, in fact are a strategic competitive concern for management; thereby demanding focus, action and consideration for supply chain managers (Lee, 2010).

Despite sustainability measures bring their own challenges, organisations need to consider long term gains over short term costs when considering the implementation of sustainability practices across the supply chain (Linton, Klassen & Jayaraman, 2007). Several organisations in an attempt to reduce costs have maintained a short term focus to sustainability resulting in corrosion of their reputations and diminishing competitive advantage (Perez-Aleman & Sandilands, 2008). Thus, it is imperative that organisations consider the implementation of sustainability practices through adopting an integrated consideration of the entire supply chain.

4.1 Defining SSCM in the steel industry

Sustainability is a diffuse and contested concept. Hence, it is important to compare how different organisations individually understand and implement sustainability and how this plays out across the total supply chain. The Sustainability Phase Model (Dunphy et al, 2007) at appendix C is widely used as a framework to understand and compare different business approaches to sustainability. With energy efficiency of example, there may be a focus on the Efficiency Phase, but this could also be part of an overall longterm strategy to embed sustainability in overall business practices. Brown, Ibrahim, Brown, Benn and Crittenden (2013) argue that a more radical approach to how many organisations practice energy efficiency may be necessary to keep total pollution from energy intensive processes within socially acceptable

Table 2: Understanding SSCM

Themes	Understanding of SSCM
Organisational competitiveness	Organisations meet their requirements for goods and services in a way that generates benefits for the organisation, whilst minimising environmental damage.
Addressing wider community requirements	All links in manufacturing chain are operated and managed in a way that ensures legislative and community expectations are met. Sustainable management must address the economic, ecological and social aspects of an operation.
Value adding through responsible procurement	Sourcing from parties that show responsible management practices, supplying to customers with evidence of responsible management practices, analysing one's position in a supply chain to seek value add improvements.
Shared benefit along supply chain	Economic and environmental thinking is not short term but the continuity of the customer business is also taken into account. There should be mutual benefits generated for the parties involved in the SSCM.

limits. This is consistent with adopting the Transformation approach articulated in the Sustainability Phase model (at Appendix C) to approach energy efficiency initiatives. The model can also be applied to understanding how the supply chain as a whole might be performing. The

general requirements of SSCM are set out in Table 2. However, these may be interpreted differently according to the positions of the individual supply chain members on the phase model.

4.2 Managing energy flows

A number of information systems utilised and/or required to manage energy flows along the supply chain. Accordingly, the problem of data collection and quality is not just a problem of collecting data from supply chain partners, but also internally within specific supply chain member organisations as summarised in Table 3. The above discussion suggests that a way of making data collection easier both within and between members, such as a purpose build tool, would be beneficial.

Table 3: Summary of internal and external factors required to manage energy flows

Respondent themes	Information systems
Internal management activities	Plant wide energy balances, Energy audits and optimization studies for clients; Process technology studies; sustainability reporting
External reporting	As required by legislation
Life Cycle Analysis	Life Cycle Inventory (LCI) data is collected to focus on sustainability. LCA is the next important phase to measure and report on energy in the full life cycle of products.
Integrated internal/external systems	Greenhouse & Energy Reporting System that pulls energy and greenhouse information to feed internal and external reports

As part of our analysis, we have developed a nomological framework (Appendix D) to illustrate a holistic image of SSCM that can contribute towards strategy development in the area. In order to create an environment that is conducive to the implementation of SSCM, organisations must first initiate transparency in their communication with suppliers, engage suppliers to collaborate and finally set an example through governance and leadership.

5.0 Summary: Drivers of SSCM

Researchers have shown that embedding sustainability along the supply chain can add business value in terms of cost reduction, revenue generation, resiliency, and legitimacy and image (Park et al., 2010) and that factors such as corporate codes of conduct and core quality management programs can support its uptake (Kaynak & Montiel, 2009). Implementation of sustainable practices in the supply chain is more likely if there are identifiable benefits from the demonstrated action or risks from inaction (Faisal, 2010). Organisations must implement change by transparently weaving sustainability through their integral operations. Ultimately organisations need to consider sustainable supply chain management alongside issues such as inventory, cycle time, quality, and the costs of materials, production, and logistics (Lee, 2010).

5.1 The role of accountants

There seems to be a consensus that Standards/Metrics are required for companies to follow, and for these Standards to be set up and/or policed by a 3rd party. It is our recommendation that

an external body may not be needed to ensure companies are abiding by the standards, but rather for accountants to play the role of monitors of sustainability standards. The accounting profession has institutionalised the key principles embedded in the eight program attributes of a Responsible Certification Scheme (see Table 1) via accounting standards, assurance practices, professional standards and other institutionalised practices. A company's internal accountants also have access to the necessary information, and it is within the scope of their work which the application of sustainability practices and standards can occur. Hence, accountants have a greater role to play in the compilation of sustainability information and management than currently is the practice in many firms. At present, one of the key barriers to a holistic assessment of the steel supply chain is the lack of information sharing, transparency, flexibility, traceability and independent voice mechanisms across the supply chain. This can be rectified by shared standards for recording, measuring and reporting sustainability information within an organisation's accounting function. The SSF has already made progress in this regard through its Responsible Steel Scheme, which seeks to create a structured, efficient and multi-metric method that enables steel supply chain members to communicate their efforts.

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Appendix A – SSF Members

Sponsoring members

BHP Billiton

Arrium Materials and Mining

BlueScope Steel

Affiliate members

Australasian Slag Association (ASA)

Welding Technology Institute of Australia

Australian Steel Institute (ASI)

Galvanizers Association of Australia (GAA)

Steel Reinforcement Institute of Australia

CSIRO

Welding Technology Institute of Australia

National Association of Steel-Framed Housing

Federation of Automotive Product Manufactureres

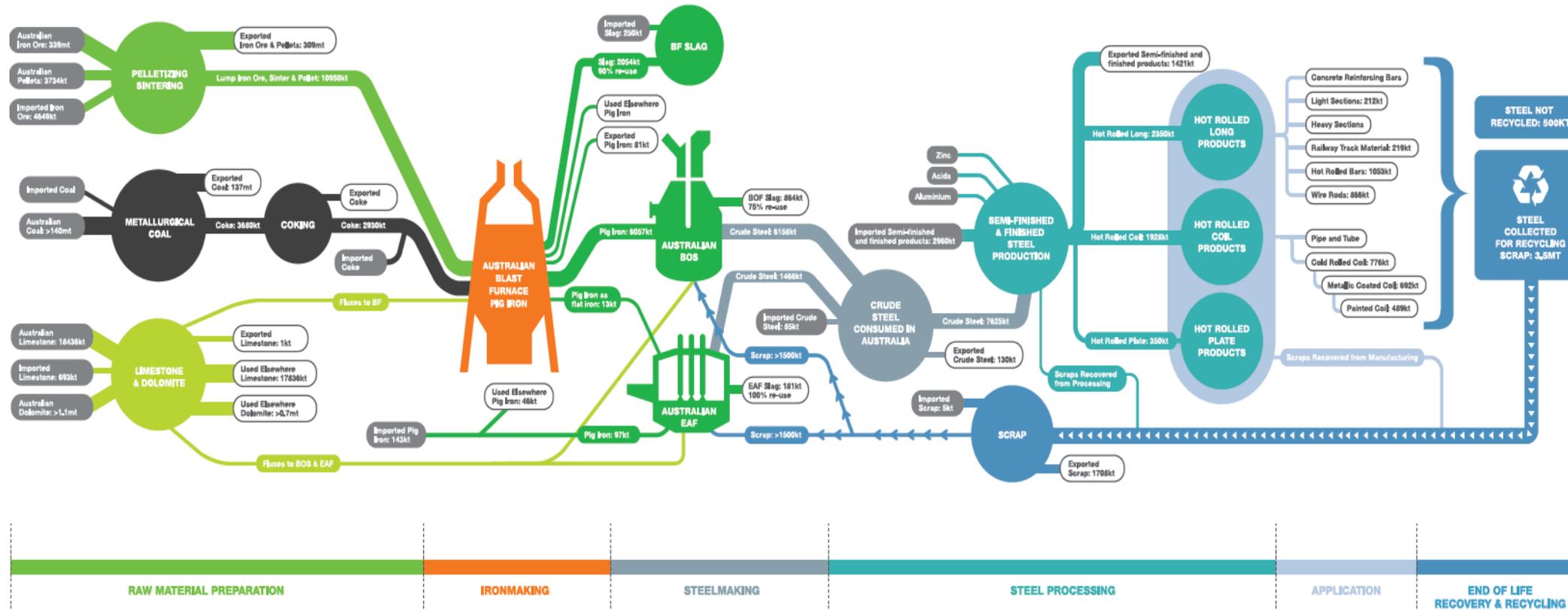
Greening Australia

GHD

Source: SSF Website, 2013

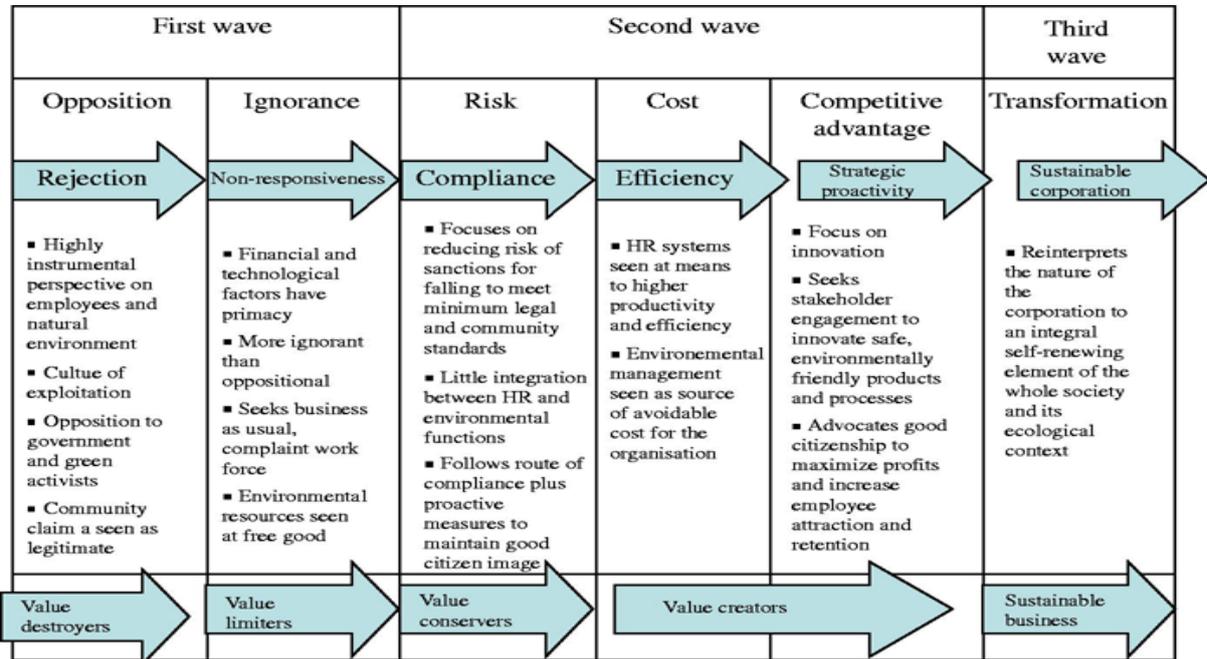
Appendix B - Material Flows within Steel Supply Chain to the Australian Market 2007-2008

Australian Steel Material Flows 2007-2008



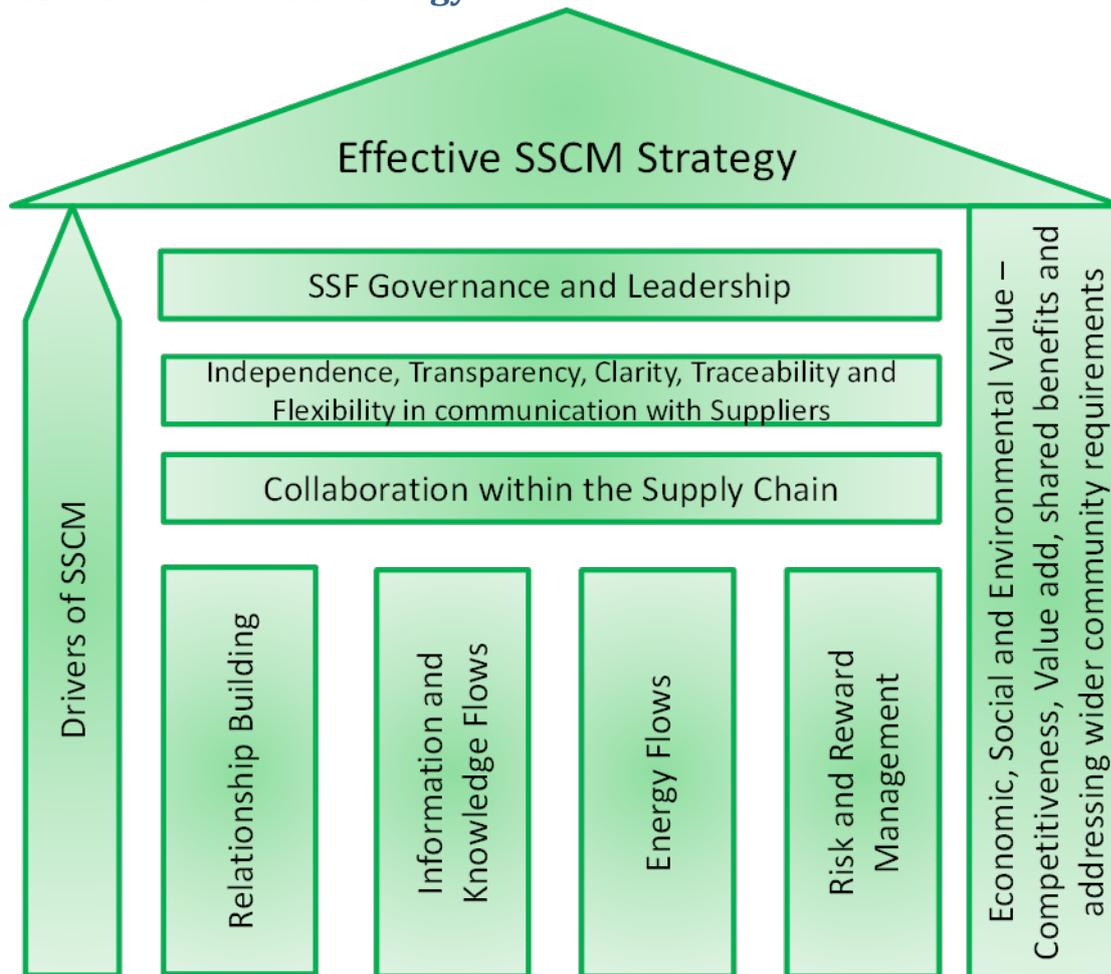
Source: Energetics, 2012, *Steel Stewardship Forum Australia – Steel Chain Footprint Project*, prepared in association with Steel Stewardship Forum by Energetics Pty Ltd, May 2012, North Sydney, NSW, REF: J/N 109737, pp. 97.

Appendix C – Sustainability Phase Model (Dunphy, Griffiths and Benn, 2007)



Source: Dunphy *et al.* (2007, p. 17)

Appendix D – A Nomological Framework for the implementation of an effective SSF SSCM strategy



Appendix E – Objectives of the Responsible Steel Scheme

What the Scheme is

Certification of an independently audited set of the key performance criteria required to establish the sustainability credentials of a steel product supply chain into the Australian market.

Certification to be recognised by use of an appropriate label.

What the Scheme will achieve

- A structured, efficient and multi metric method for steel supply chain companies to communicate their company and product credentials to the public and market

- Performance benchmarking, setting of improvement targets and monitoring of progress towards achieving targets
- Member access to resources and networks to assist in improving performance eg energy efficiency and profitability
- Differentiation of certified participant companies and their products from others in the market
- Savings in time, effort and money for the participants and their customers when they have to verify their sustainability attributes.
- Acceptance by specifiers and purchasers – seen as a valuable and differentiating requirement in specifying materials and suppliers for projects.
- An integral component of rating tools
- Help certified participants to meet current and future demands for reliably audited sustainability credentials for their products

Appendix F – Secondary Documents

Touching the Earth lightly... Australian steel's role in a sustainable world, September 2008, Australian Steel Institute

Update on Steel Stewardship Forum: Progress for 2010/2011, August 2011

Responsible Steel: Scoping Document, November 2011, by PE Australasia Ltd, prepared for SSF

Steel Chain Footprint Project, May 2012, by Energetics Pty Ltd, prepared for SSF

Responsible Steel: Business Plan, June 2012, by PE Australia Pty Ltd, prepared for SSF

SSF Responsible Steel – Value Presentation, June 2012
Responsible Steel Objectives – SSF website
www.steelstewardship.com