

Promoting Energy Savings and GHG Mitigation Through Industrial Supply Chain Initiatives

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Authored by:

Amélie Goldberg, *Institute for Industrial Productivity*

Emelia Holdaway, *Ecofys UK*

Julia Reinaud, *Institute for Industrial Productivity*

Siobhan O'Keeffe, *Ecofys UK*



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1 Executive Summary

Among the most urgent and high-profile sustainability topics facing business today are minimising greenhouse gas emissions and reducing energy consumption from industrial processes. Industry consumes one-third of final energy demand, and that share is growing steadily. Actions to reduce industrial energy consumption can offer companies cost savings, productivity gains and other benefits. When industrial companies undertake structured interventions that are able to exert significant leverage with their suppliers, the interventions can be an effective way to achieve energy and climate change goals among a number of disparate businesses and across national borders. These so-called “supply chain initiatives” (SCIs) can result in tangible benefits including cost savings, reduced exposure to climate-related risks, energy and GHG performance, and improvements in productivity, product quality and other co-benefits (e.g. water efficiency).

This paper aims to explore the diverse range of approaches that buyers are undertaking to influence manufacturers and industrial companies and to understand what models and design features are successful and could be leveraged or scaled across a greater number of companies.

1 Project Overview

This paper researches ten SCI case studies across a range of sectors and geographical regions that affect industrial GHG emissions or energy use, and that are housed on a free online database. The case studies cover the following nine companies and one government initiative: BASF (chemical company), British Gypsum (plaster and plasterboard manufacturer), Ford (automobile manufacturer), General Electric (a wide range of energy, industrial and technology solutions), Ikea (furnishings and homeware), Home Depot (hardware store), Prorail (construction and maintenance of the Netherlands rail network), SKF (manufacturer of bearings, seals and engineering solutions), Walmart (grocery and general store) and China’s city government-led Suzhou Energy Efficiency Star Scheme. The case studies present a wide range of tools and efforts used as part of initiatives to drive supply chain GHG reductions, such as audits, workshops, and environmental management systems.

The initiators (or buyers) of the SCIs profiled are a mix of market aggregators (e.g. GE) and retailers (e.g. IKEA, Walmart) and manufacturing companies (e.g. BASF, British Gypsum).

Market aggregators/large retailers account for the majority of SCI activity, because these are the consumer-facing companies with greater visibility and pressure to reduce environmental impacts. Because of their position further down the value chain, their suppliers are manufacturers of intermediate or specialised products rather than basic material manufacturers that typically qualify as heavy industry.

1.2 Business Case for Supply Chain Initiatives

Although supplier data is generally lacking, multiple benefits to both suppliers and buyers were found among the ten case studies. These benefits include cost savings through increased energy efficiency, marketing and reputation benefits, improved business relationships, and reduced risks related to climate change concerns, energy costs and reliability. Some specific GHG, energy and cost savings are noted below:

- **General Electric** noted that one of its suppliers increased its energy efficiency and reduced GHG emissions through energy-saving measures and facility upgrades following its auditing and capacity building programme. Between 2009 and 2011, the supplier’s carbon emissions fell by 19%.
- One of **Ikea’s** suppliers, a glassware company in China, upgraded its furnaces and switched the fuel source from coal to natural gas as a participant in the IKEA-WWF “Developing Climate Positive Opportunities for Suppliers” partnership, which focuses on building capacity and implementing energy saving projects for Ikea’s suppliers. The company reduced its GHG emissions by 35% between 2009 and 2010. Another textile supplier in Bangladesh identified and implemented a number of efficiency measures in 2011 that reduced energy consumption by 29% and cut CO2 emissions by 25%.
- Under **Walmart’s** Supplier Energy Efficiency Program, Walmart covers the cost of energy audits if the energy efficiency opportunities identified through these audits are implemented. VonDrehle Corporation, a paper manufacturer in the United States, undertook an energy audit of its lighting and air conditioning. Subsequently, VonDrehle implemented efficiency upgrades with a payback period of less than four years.

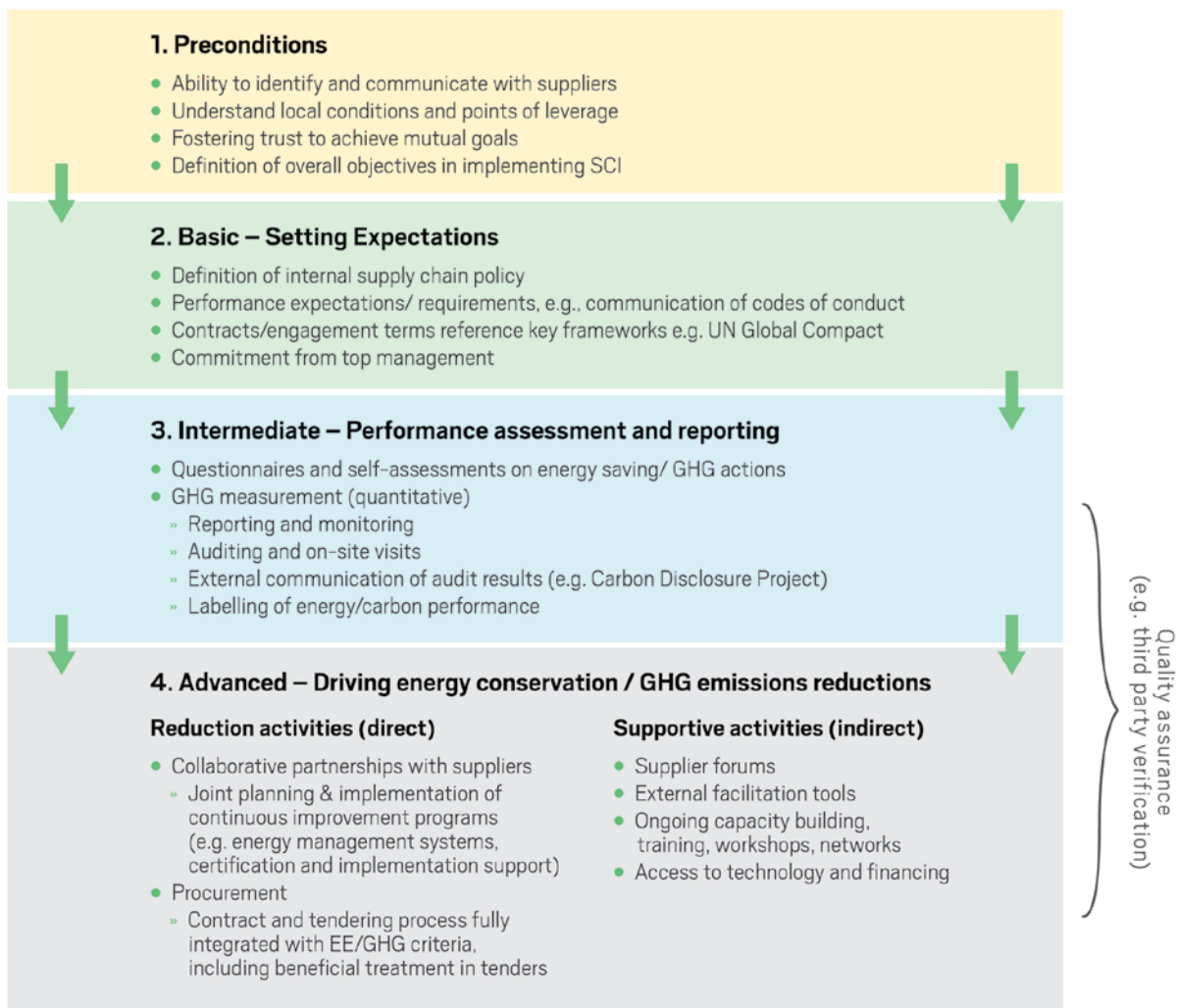


- Administrators of the CO² Performance Ladder, a scheme used by **Prorail** that provides a virtual discount of up to 10% according to the supplier’s performance along the Ladder, report that participating companies have seen an approximate 2-3% improvement in energy efficiency year on year.
- The **Home Depot** partnered with Intertek to work with 29 supplier factories in China. Intertek provides capacity building involving on-site energy assessments, and identification and implementation of energy saving measures. The programme cost US\$43,500 (paid by the suppliers), and achieved overall cost savings of over \$US3 million.

1.3 Successful SCI Design and Lessons Learned

Each of the SCI activities profiled can help to facilitate supplier GHG reductions, although implementation of individual tools and measures in isolation can limit their effectiveness. For SCI approaches to be effective, they should combine several complementary elements and processes. Figure ES-1 outlines the key design features and steps such as ensuring that a common understanding exists of the goal of the SCI to build trust and achieve shared objectives, increasing the ambition of efforts over time, using energy or environmental management systems (EnMS or EMS), and implementing capacity building and direct financial support and expertise to reduce supplier GHG emissions.

FIGURE 1 Building an effective supply chain initiative





1.4 Key Factors for Success

From analysing the ten case studies, as well as supplementing analysis through literature reviews, this paper proposes general design features and approaches that are deemed to be robust approaches to implementing an SCI. For example, audits can raise awareness of GHG emissions and energy use within a supplier, and provide an understanding of “hotspots”. Audits

can be resource intensive to complete, however, and can “sit on the shelf” if no follow-up is required. Commitment from top management through an energy management system (EnMS), coupled with training and workshops, can help to build the capacity needed to exploit opportunities identified in an audit. Key factors for success include:

TABLE 1 Description of the key types of supply chain initiatives selected

Supplier Selection	Focusing on a select group of suppliers rather than the buyer company’s entire supplier base
1. Partnership and Fostering Trust	Working in partnership with suppliers on specific programs to foster trust so that suppliers are comfortable working on sensitive topics such as energy or GHG management and achieve GHG reductions, rather than imposing mandatory requirements without support to suppliers to reach those goals
2. Multi-Pronged Elements	Combining several complementary elements within an initiative, such as external platforms, auditing, capacity building and direct financial support and expertise to reduce supplier GHG emissions
3. Cumulative Approaches	Cumulative, stepwise approaches with increasing ambition
4. Third Party Involvement	Third-party involvement, i.e. partnering with external organisations such as non-governmental organisations to provide additional expertise and credibility, using external tools such as energy management systems (EnMS) or environmental management systems (EMS) standards (ISO 14001 and ISO 50001), or certifying energy savings/ GHG emissions reductions.
5. Leadership Commitment	Executive or board-level support and engagement within the supplier to participate with the supply chain initiative
6. Tailored to Local and Sectoral Conditions	Understanding of local conditions and points of leverage.



1.5 Application to Heavy Industry Suppliers

Most of the information available was between large retailers and their suppliers of intermediate products (e.g. automotive body parts), rather than suppliers of basic industrial products (e.g. steel slabs). The make-up and drivers of a heavy industry supply chain – highly commoditised, powerful suppliers, existing policies directly targeting heavy industry – present challenges for buyer companies wishing to develop an SCI directly with heavy industry companies. In addition, suppliers of heavy industrial products do not usually sell materials directly to the initiators of the SCIs, which are generally the consumer-facing companies. Instead, heavy industrial suppliers sell to intermediate manufacturers, and these intermediate manufacturers sell their products to the consumer-facing supply chain initiators. For example, Ford’s SCI engagement is with its Tier 1 suppliers, i.e. its suppliers of auto body parts. These Tier 1 suppliers have their own sheet metal suppliers (Tier 2 suppliers). Therefore, little direct interaction occurs between Ford and its suppliers of heavy industry materials further upstream.

With these challenges in mind, policymakers cannot easily identify a clear point of leverage with which to influence the

supply chain of heavy industry. It is important to look more closely at a subsector level and at local circumstances. This report offers several opportunities, however. If suppliers have significant leverage, buyer companies wishing to engage heavy industry in GHG reduction activities could consider establishing consortia of buyers, to increase their influence and leverage where needed. Approaches similar to the CO2 Performance Ladder (where a virtual discount of up to 10% is offered by the buyer according to the supplier’s performance along the Ladder) appear to be well suited to engaging heavy industry. This is the case for Prorail, which manages large contracts for the construction and maintenance of the rail network across the Netherlands. For large buyers (including state-owned enterprises) that conduct infrastructure and public procurement projects such as rail, roads and public buildings, SCIs could be integrated into systemwide approaches such as low-carbon city initiatives that involve municipalities, public works, the buildings sector, retailers and government agencies. Buyers could also look at leveraging existing voluntary labelling schemes such as the Suzhou scheme, and (while not profiled in this report) voluntary building labelling schemes. For example, the Green Building Council of Australia awards rating credits for buildings that use steel from a “responsible steel maker”.



2 Introduction

2.1 Project scope and objectives

The Institute for Industrial Productivity (IIP) has developed a database/library of supply chain initiatives (SCIs) targeting industrial energy consumption and greenhouse gas (GHG) emissions. IIP's objective is to showcase to industry stakeholders successful SCIs from around the world that promote sustainable supply chain practices and result in tangible benefits – reduced energy use and GHG emissions – as well as improvements in productivity and other co-benefits (e.g. product quality, water efficiency). IIP's overall aim is to find the means to encourage less-emitting production processes by looking at GHG emissions levels in purchasing decisions, with a focus on stakeholders in IIP's regions of operation (China, India, United States and European Union).

This report compiles ten case studies of SCIs from across a range of sectors and geographical regions. The initiatives show a diverse range of approaches being undertaken to influence and motivate suppliers (e.g. cost sharing of energy audits, awards, targets, etc.), and cover a broad range of sectors (e.g. retail, automotive, rail, gypsum). The case studies are company-based supply chain GHG emission reduction or energy saving programmes, whereby companies work with supply chain partners to support their partners to reduce GHG emissions (as opposed to product-based initiatives). The different categories of approaches used in this project are described in more detail in section 1.3.

In its analysis of the ten profiled case studies, this report examines the benefits of the different approaches employed, the effectiveness of these initiatives, and the lessons learned by the organisations leading their implementation. The report also assesses the potential to apply SCIs to save energy and reduce GHG emissions in heavy industry (e.g. iron and steel, cement, chemicals). Research was undertaken through interviews with the companies leading the SCIs and desk research. It concludes with some key messages on the main factors for consideration by buyers or organisations seeking to reduce supply chain GHG emissions.

2.2 Context

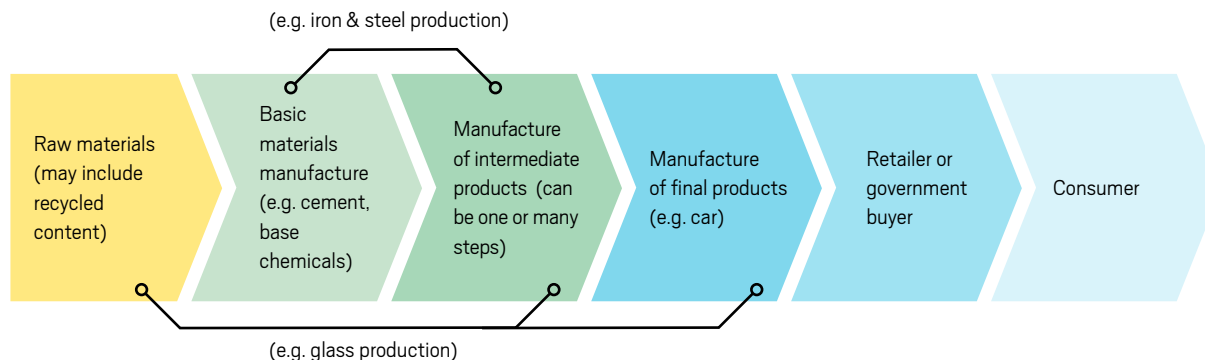
As awareness grows of the impact of human activities on the planet, consumers and investors have an increasing expectation that companies visibly operate in a responsible and sustainable manner. Minimising GHG emissions from industrial processes is one of the most urgent and high-profile sustainability topics facing business today. For many downstream consumer-facing companies (e.g. Walmart), sustainability has now become a key competitive differentiator. Corporate boardrooms now increasingly take into account public, market and investor preferences (Reinaud and Goldberg, 2011).

Although global surveys of corporate leadership (see Blackhurst et al., 2012) show that executives believe sustainability has and will continue to have a material impact on their business, many state that they are still not exploiting opportunities fully. Companies focus first on actions within their own company, but extending sustainability across the supply chain is becoming increasingly important. Among the small number of global firms that have adhere to the Carbon Disclosure Project to manage their climate change impacts, 62% of these companies now reward suppliers who employ strong environmental practices, up from 20% in 2010 and 19% in 2009 (CDP, 2012).

A substantial share of a company's carbon footprint may come from its supply chain rather than its internal emissions. On average, 40% to 60% of a manufacturing company's carbon footprint is from its supply chain (CERES, 2010), and this percentage can be much greater, as much as 80%, for a retailer (Brickman and Ungerman, 2008). This proportion is due to the energy and GHG intensity of heavy industrial upstream processes such as steelmaking. Figure 1 is a simplified illustration of the different types of companies across the entire value chain involving heavy industry suppliers. For a definition of the different actors, refer to the glossary in Appendix 1. Note that not every stage is relevant for all industrial sub-sectors. Each supply chain structure is different according the raw materials, intermediate industrial product(s) and the final product. In addition, some of the stages occur within a single facility or company.



FIGURE 2 Different Players and Tiers in Industrial/Manufacturing-Based Supply Chain



The arrows demonstrate examples where multiple supply chain steps may exist within in a single facility or company

2.2.1 Benefits of Energy/Carbon Efficient Supply Chains

The drivers for companies to engage their suppliers are both external and internal. External drivers are increasing with greater public, consumer and investor awareness of previously opaque and complex supply chains and the processes necessary for making consumer goods. Poor performance earlier in the supply chain can damage a company’s credibility, profit margins and competitiveness, so a company that wants to control its risks related to corporate reputation and protect its value, begins by ensuring an adequate management of the supply chain (UN GCNS, 2009). An important internal driver is a company’s own sophistication with addressing its own Scope 1 (i.e. direct emissions) and Scope 2 emissions (i.e. indirect emissions purchased electricity, heat or steam, see Glossary). With upwards of 40% of their full value chain emissions found outside their own gate, the greatest opportunities (and risks) can be found by working with suppliers (and customers).

An energy efficient supply chain can result in benefits for buyers by reducing their exposure to climate policy and energy risks passed through from their supply chain (such as a high carbon price in emissions trading schemes, rising energy prices, and potential supply chain disruption due to insecure energy supply). In addition, improved energy management may also contribute to improved quality and management of other resources by the supplier, resulting in a potentially better product and pass-through of cost savings. As identified by BSR (2010), companies are also likely to find synergies between efficiency and other resource-productivity issues, such as water savings, better process quality and throughput, and reduced downtime and maintenance costs. Once employees

are tasked with saving energy, they are likely to find total quality improvements (e.g. “Kaizen”). This was the case in the aggregates industry (non-metallic minerals), where internal employee teams set up to consider ways of reducing energy use led to culture shift (Carbon Trust, 2012a). Benchmarking studies show significant cost differences between organisations that exhibit best-in-class energy efficiency performance and those with average performance (Supply Chain Council, 2012).

Supply chain initiatives can also capture new financing options. The upfront costs associated with energy-efficient technologies for many suppliers may be prohibitively expensive and even when resources are available, it can be difficult to quantify the potential energy savings and return on investment for some supply chains, making investment seem less attractive. For example, the IFC helps addresses these issues by assisting local financial institutions to offer financing packages and supplier capacity building designed to improve supplier business performance and credit risk, while generating attractive portfolio returns from an untapped market (IFC, 2012).

2.2.2 Challenges to engaging suppliers

Engaging with suppliers to reduce energy or emissions presents a number of challenges, however. Globalisation has led to increasingly complex, global and decentralised value chains (UN GCNS, 2009), which can hamper efforts to coordinate supply chain initiatives and monitor their impact. Companies have direct control of the energy/emissions intensity of their own processes, but engaging their suppliers to do so is much less straightforward. The magnitude of the environmental impact is usually greater at the beginning (e.g. basic materials manufacture) or end (e.g.



consumer use or waste disposal) of the value chain, rather than in intermediate manufacture or retail (Prindle, 2010). Therefore, a company's location on the value chain determines its direct ability to mitigate overall impacts. A company's relative level of control in initiating an SCI is sometimes inversely correlated to its relative impact (Prindle, 2010).

Tension may also exist between both a sustainability best practice and the tightness of profit margins in different regions, making suppliers in some regions with lower sustainability standards more sensitive than those in other regions to implementing initiatives that do not adhere to the cheapest operating procedures (Sherman et al., 2012). As discussed further in section 4.2, suppliers may also have concerns about sharing confidential or sensitive energy data, because such disclosure might result in buyers requesting price or cost reductions.

Buyer companies must have an understanding of the overall emissions impact of their supply chain to most effectively guide their suppliers' emissions reductions activities. Although many companies have been managing their own energy efficiency

and environmental performance for a decade or more, SCIs are relatively new, taking formal shape only in the last few years for many companies and still in developmental stages for many others (Prindle, 2010). For example, the Value Chain (Scope 3) Accounting and Reporting Standard (see Appendix) was released in October 2011. A similar or parallel approach is carbon footprinting, where companies focus on the embedded CO₂ or GHG emissions from raw materials extraction to waste disposal/recycling rather than engaging all or a subset of suppliers in company-level initiatives (see Glossary).

To overcome some of these challenges, buyer companies need to develop new capabilities and processes to engage in effective supply chain initiatives – such as broad collaborations that operate on a systemwide basis and across internal and external boundaries (Blackhurst et al. 2012).

Section 3 explores some of the different existing approaches taken in managing and reducing supply chain emissions and energy use, and assesses some of the key factors for success in developing an effective supply chain initiative.



3 Overview of Selected Supply Chain Initiatives

Ten supply chain initiatives were explored as case studies to identify the range of approaches to reduce supply chain energy or emissions. This section reviews the case studies in terms of the types of activities undertaken (according to the categories of activities identified in Table 1), their sector and geographic spread, and their reach in terms of which stage or actors across the supply chain are influenced by the initiator of the SCI.

This work complements other efforts to document SCI practices, such as the work by the Pew Centre of Global Climate Change (Prindle, 2010), the BSR (2010), WRI (2010), Carbon Trust (through the PAS 2050) and WBCSD (2012) among others.

A difference, however, is that this report focuses to a greater extent on energy-intensive sectors, rather than light industry (such as electronics, food and beverage, and textile sectors), and proposes SCI classifications according to the different activities and types of engagement.

3.1 Key types of supply chain initiatives

Organisations leading SCIs may elect to implement a specific category type, or adopt a combination of approaches. Table 1 lists the different types of supply chain initiatives identified in this study.

TABLE 2 Summary of supply chain initiatives

Type of SCI	Description	Existing Examples
Mandatory performance requirements	The buyer requires the supplier to comply with set criteria. These criteria can include undertaking audits (that the supplier funds), meeting certification standards such as ISO14001, and meeting targets for improved energy performance.	<ul style="list-style-type: none"> ● Ford ● SKF
Purchasing approaches	Buyer develops procurement policies whereby suppliers score higher or lower or are advantaged or disadvantaged in the procurement process due to their existing performance and profile. This approach differs from “mandatory performance requirements”, which provide criteria for inclusion or exclusion from the procurement process.	<ul style="list-style-type: none"> ● ProRail CO2 Performance Ladder
Reporting and monitoring	Suppliers must report their emissions or energy use to their buyers. This reporting can be done via surveys, questionnaires or online portals that the supplier completes. Buyers may undertake appraisal or risk assessments of supplier performance based on the reporting provided.	<ul style="list-style-type: none"> ● BASF
Subsidised audits	On-site audits (full or partially funded by the buyer) to determine a supplier's GHG/energy performance. This type of audit is distinct from “mandatory performance requirements”, where the supplier funds the audit.	<ul style="list-style-type: none"> ● Walmart ● IKEA ● Ford Motor Company
Capacity building and implementation support	Training, workshops and other measures to improve suppliers' ability to improve their performance. Measures could be financial assistance, workshops, tools, or buyers may fund or organise assessments to identify energy saving opportunities, which suppliers then implement at their own cost. This excludes supplier forums, which are separately described	<ul style="list-style-type: none"> ● General Electric ● Walmart ● Marks and Spencer
Supplier forums or coalitions	Conferences, meetings, webinars or online forums where buyers can communicate priorities, and suppliers can ask questions, receive feedback and share best practice among themselves.	<ul style="list-style-type: none"> ● Intertek ● Walmart ● Tesco
Labelling	Labelling of energy performance to demonstrate as an informational tool for buyers. The labelling can refer to the energy or carbon performance of a supplier's processes, or of the overall life cycle energy or carbon performance of a product.	<ul style="list-style-type: none"> ● Suzhou Energy Efficiency Star programme
External facilitation tools	Platforms that help connect or match GHG/energy performance of suppliers with buyers' interests or criteria.	<ul style="list-style-type: none"> ● Sedex (B&Q) ● EcoVadis (Alstom) ● Efficiency Exchange ● Intertek



3.2 Description of the ten SCIs by type

Table 2 summarises each of the ten SCIs profiled in this report and available on IIP’s Database of Supply Chain Initiatives for Industry.

TABLE 2 Summary of supply chain initiatives

Case study, launch date	Type	Description
Walmart, 2009	Reporting and Monitoring, Subsidised Audits, Capacity Building and Implementation Support	Walmart, the largest grocery and general merchandise store in the United States, has implemented several initiatives to reduce supply chain emissions. The Supplier Energy Efficiency Program and Supplier GHG Innovation Program are both collaborative programmes that allow the sharing of lessons learned, and the implementation of carbon reduction measures along Wal-Mart’s most energy-intensive value chains. Walmart also partially funded the establishment of the Guangdong Environment, Health & Safety (EHS) Academy in China, which provides training on environmental management (among other issues).
Ford, 2010	Subsidised Audits, Capacity Building and Implementation Support	Ford implements its Aligned Business Framework, through which Ford works with suppliers to establish targets and processes in line with Ford’s own environmental commitments. Ford has also undertaken a data collection and reporting pilot with key suppliers, as well as played a leading role in sector initiatives to introduce carbon reporting into the automotive sector. Ford was also the first car manufacturer to require its suppliers to implement ISO standard 14001 in their facilities.
Prorail, 2005	Purchasing Approaches	Prorail, the Netherland’s rail infrastructure agency, uses the CO2-Performance Ladder, a procurement tool whereby participating suppliers obtain external verification of their carbon management approach, scored on a 1-5 scale against a number of set criteria. A score of 5 is awarded an advantage equivalent to a 10% discount on the price of their bid in the tender evaluation process; lesser scores receive awards equivalent to smaller discounts. Prorail’s suppliers are predominantly cement, steel and other construction materials companies, as well as subcontractors that undertake the construction and maintenance work.
Suzhou Energy Efficiency Star scheme, 2010	Labelling, Subsidised Audits,	The Suzhou Energy Efficiency Star Scheme, administered by the Suzhou Energy Conservation Centre (based in Jiangsu Province, China), rates participating companies on energy efficiency, and provides training and support to increase efficiency among manufacturing suppliers (mostly textiles, electronics, iron and steel, chemicals, and building materials). The programme is now extending its emphasis to engage domestic and international buyers to drive demand for the label, because this has been one barrier to the scheme’s expansion.
IKEA, 2000	Subsidised Audits, Capacity Building and Implementation Support	IKEA aims to foster long-term relationships with suppliers that demonstrably share their values, including those relating to the environment. To monitor suppliers, IKEA regularly carries out an on-site audit of its suppliers. This audit involves talking to employees and inspecting documents and records. IKEA visits suppliers on-site on a number of occasions to ensure that they are following the company’s code of conduct for suppliers, known as IKEA Way (IWAY). It is also working with the World Wildlife Fund (WWF) on a “Developing Climate Positive Opportunities for Suppliers”, Global Social Compliance Programme (GSCP), an industry-initiated programme working towards a sustainable approach for the improvement of working and environmental conditions in global supply chains. Ikea’s suppliers are from a number of sectors (forestry, metals, textiles, glass, plastics, and general manufacturing).



Case study, launch date	Type	Description
SKF, 2007	Reporting and Monitoring, Purchasing Approaches	SKF (manufacturer of bearings, seals and engineering solutions) requests the most energy intensive of its major suppliers to report their GHG emissions, and provides an annual award that recognises strong sustainability performance by suppliers. For all new machinery orders, when suppliers are submitting their tenders, they are asked to describe energy efficiency features for their products that will support SKF meeting its carbon reduction target. SKF also reports on supplier emissions (Scope 3) as part of the Carbon Disclosure Project Supply Chain Programme. In 2008, the company launched an Energy Challenge to encourage machine suppliers to provide more energy-efficient machines. As part of its supplier code of conduct, SKF also expects suppliers to work towards and obtain ISO standard 14001.
British Gypsum, 2007	Mandatory Supplier Requirements	British Gypsum (plaster and plasterboard manufacturer) has undertaken a Responsible Sourcing Strategy that involves scoring its top 100 suppliers against a range of sustainability criteria, and requiring all suppliers to achieve a rating of 'C' or above. Companies that do not meet the minimum requirements must undertake a programme of improvement in collaboration with British Gypsum to remain a British Gypsum supplier; suppliers that do not comply may lose their supplier status.
General Electric, 2010	Subsidised Audits, Capacity Building and Implementation Support	General Electric (GE) is building capacity in suppliers' factories in China to achieve carbon reductions by the delivery of local training programmes as well as the hosting of capacity-building supplier summits and other events. General Electric also conducts on-site audits for all suppliers to identify points for improving environmental performance. These audits include questions about energy use. GE has also encouraged its suppliers to undertake energy "Treasure Hunts", a model whereby employees within a company identify energy-saving opportunities. Along with Walmart and the Institute for Sustainable Communities, GE also helped to establish the Guangdong EHS Academy, and provided expert trainers to host workshops at the Academy.
BASF, 2006	Capacity Building and Implementation Support	BASF (chemical manufacturer) is participating in a capacity-building initiative with selected suppliers in China to boost sustainability practices. BASF also participated in the China Business Council for Sustainable Development's (CBCSD) '1+3' initiative, in which companies are expected to train three of their partners in their value chain, which are then, in turn, expected to engage three further partners within their own value chain, thereby creating a "snowball" effect. BASF formed a team with three business partners along its supply chain to support best practices in Corporate Social Responsibility (CSR) in each company. BASF also reports its emissions as part of the Carbon Disclosure Project (CDP) Supply Chain Programme, and was judged to be the top-ranking company, because it was the only company to disclose emissions in all Scope 3 categories. It is also a member of the Sustainability Consortium, an independent global organisation working to improve consumer product sustainability.
Home Depot and Intertek's Think Green Initiative	Reporting and Monitoring, Capacity Building and Implementation Support	The Home Depot hardware store has drawn on Intertek's Think Green Initiative to improve the performance of its suppliers. The Think Green Initiative is a capacity-building initiative involving on-site assessment by an external company (Intertek) of the current performance of an installation, and the identification and implementation of energy-saving measures.



3.3 Sector and geographic trends

The initiators of the SCIs analysed in this report come from a range of sectors, including the retail, automotive, engineering and industrial sectors. The buyers profiled are a mix of market aggregators and retailers (e.g. IKEA and Walmart) and manufacturing companies (e.g. BASF and British Gypsum), as outlined in Figure 2.

Market aggregators/large retailers account for the majority of SCI activity. These actors appear to have greater impetus and engagement in targeting the manufacture of intermediate products or basic materials as compared to basic material manufacturers implementing their SCIs themselves. For aggregators such as Walmart, supply chain emissions can

constitute the largest source of emissions within the value chain. Walmart estimates that supply chain emissions account for 92% of its footprint. Hence these companies have a strong driver to engage with suppliers on reducing emissions.

Limited examples are available of SCIs being initiated by heavy industry sectors (e.g. iron and steel). This absence is likely due to the fact that energy-intensive companies such as cement or steel manufacturers have relatively short supply chains (as also explained by Prindle, 2010). Finally, based on desktop research and interviews with some of these companies, the primary focus to date has been on improving labour conditions and local pollution. Efforts to reduce GHG emissions are seen as a “next step” in engaging with supply chains.

Figure 3 Overview of SCIs and their influence on different stages in supply chain.

The circles represent the supply chain steps in which a buyer company may be active. The arrows represent the steps in the supply chain that are sought to be influenced by the SCI, although in most cases the initiative has not been fully rolled out.

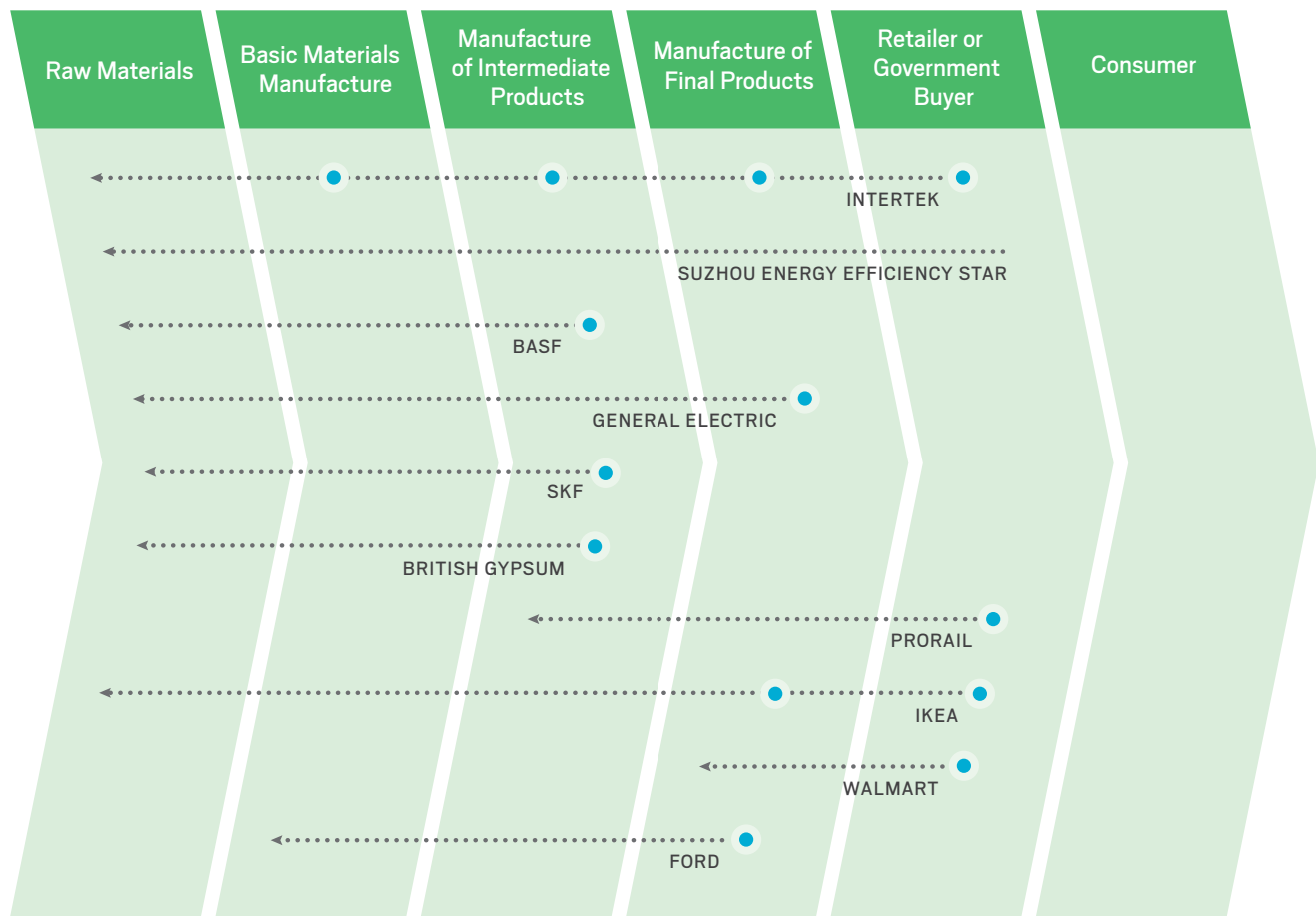


Figure 3 shows the influence of each SCI in the various stages of the supply chain.



TABLE 3 Target supply chain sectors for buyer companies implementing SCIs

Comapny name/Supply chain sectors	Chemicals & Chemical Products	Petrochemicals	Food & Tobacco	Iron & Steel	Non-Ferrous Metals (incl. aluminium)	Non-Metallic Minerals (incl. cement & glass)	Non-Speceified	Paper, Pulp & Printing	Textiles & Leather	Wood & Wood Products
Ford				✓	✓		✓		✓	
General Electric	✓	✓		✓	✓	✓	✓			✓
Walmart							✓	✓	✓	✓
SKF	✓	✓		✓	✓	✓	✓			
BASF	✓	✓								
Home Depot	✓	✓		✓	✓	✓	✓	✓	✓	✓
Suzhou Energy Efficiency Star	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
IKEA			✓				✓	✓	✓	✓
Prorail				✓	✓		✓			
British Gypsum	✓	✓				✓				✓

Table 3 shows the industrial sectors that each SCI has the potential to influence. Note that, due to lack of information, it is not clear whether each SCI is, in practice, targeting basic manufacturing further up the supply chain.

Suppliers are located around the world, although the case studies selected show a strong predominance of Chinese suppliers, in line with China’s strong export potential and manufacturing base and the fact that industries within China are also generally more energy-intensive than their peers in Europe (Enerdata, 2011).

Focus on manufacturing in China can also create opportunities for consolidation of buyer efforts to engage suppliers. For example, Walmart and GE both have a significant supplier base within China (Walmart is China’s eighth largest trading partner, EDF 2012), as mentioned in Table 2. Both companies helped to establish an Environment, Health and Safety (EHS) Academy (see Appendix 1) within China that trains suppliers on good practice over a wide range of sustainability criteria. By working alongside peers, Walmart and GE can share resources and increase the overall effectiveness of the initiative.

In many instances, SCIs will operate in the same way regardless of location. However, in the case of Walmart, two

separate SCIs were implemented to encompass two different supplier regions - the United States and China. The Walmart Supplier Energy Efficiency Program (SEEP) works with US suppliers to measure and reduce supply chain emissions. Meanwhile, the Walmart GHG Supplier Innovation Program works with Chinese suppliers to undertake the same objectives. The China programme was introduced in 2010 as a direct result of the success of the SEEP in the United States. The benefit of this approach is to show consumers that Walmart is working with the bulk of its suppliers - both major strategic suppliers abroad, as well as encouraging best practice domestically. The approach also allows Walmart to tailor its support to suppliers slightly differently, taking into account differing standards of good practice and different starting capacities within the different regions.

A range of SCI “intermediaries” or facilitators are also available to help push SCIs forward. These entities include the Institute for Industrial Productivity, the Carbon Trust, the Carbon Disclosure Project, Business for Social Responsibility (BSR), World Resources Institute (WRI), World Business Council for Sustainable Development (WBCSD), Natural Resources Defense Council (NRDC), and the US EPA Green Suppliers Network.



4 Analysis of Selected SCIs

This section provides an analysis of the ten case studies by looking at their characteristics such as the drivers and objectives of buyers and suppliers, the impacts and costs of the SCIs, and identifies some successful design features and methods of engagement.

4.1 Drivers and objectives

4.1.1 Buyers' perspectives

Among the buyer companies profiled in the case studies, the primary objective for engaging with suppliers on their energy or emissions is to build stable and sustainable relationships with business partners, and to demonstrate to investors and consumers that the buyer company is addressing its environmental impact in an informed and responsible way. Drivers are likely to be stronger where the company has a brand known by the final consumer, and is supplied by high-risk products, sector or countries (UNGCNS, 2009).

Some of the companies profiled — for example, GE and Walmart — stated that their objective was to gain and maintain a leadership role in sustainability, and to meet these expectations and gain reputational benefits by acting proactively. For such companies, supply chain emissions can represent the bulk of a company's environmental footprint, and supply chain engagement can be a key metric in demonstrating a company's commitment to sustainability. The Home Depot, for example, has set a target of reducing its US supply chain GHG emissions by 20% in 2015 compared to 2008 levels.

SKF noted that an understanding of the environmental impact of its supply chain allowed the company to better address reputational and business risks (e.g. disruption to the supply chain) to the company through poor practice by suppliers, and sent a reassuring message to investors that SKF could manage and reduce these risks. For Ford, supply chain management tied into a broader strategy to develop deep and transparent relationships with a smaller number of suppliers over the long term.

One exception to these shared objectives is the Suzhou Energy Efficiency Star Scheme, which was initially driven by government requirements to reduce energy consumption as part of efforts to mitigate the impact of its dramatic economic growth and meet the 11th Five Year Plan energy conservation goals. To date, the scheme has focused principally on engaging suppliers

through the label. It is now aiming to evolve into an SCI by engaging international buyers that would recognise the label and use the scheme to demonstrate commitment to their suppliers' energy efficiency and GHG emissions within the region.

4.1.2 Suppliers' perspectives

The driver for supplier engagement for the SCIs profiled is the same in almost every case — to meet or exceed sustainability expectations of buyer companies and hence support their competitive positioning against other suppliers and maintain the commercial relationship. For example, Ford is currently consolidating its supply base. Suppliers have an incentive to participate in the programme in order to gain or maintain their position as a strategic supplier in the Aligned Business Framework. However, supplier action to meet buyer expectations may not necessarily result in a longer-term contract and is generally only expressed as a (non-legally binding) commitment from the buyer. Conversely, within many of the SCIs profiled (e.g. GE and BASF), poor performance by suppliers to meet buyer expectations or requirements can lead to the termination of supply contracts. For example, in 2009, IKEA ceased business with ten suppliers for failure to comply with its code of conduct, known as IWAY.

Achieving cost savings through increased efficiency is also a driver. However, because actions to reduce costs by improving energy efficiency are not taken in the absence of SCIs, it can be argued that the financial opportunity for the supplier is only truly appreciated following engagement with energy-saving measures. Among the ten case studies, no evidence indicated that co-benefits (e.g. health, safety, or water efficiency) make a notable difference to the business case for low carbon measures.

4.2 Costs and impacts

The costs and impacts of the various SCIs to both suppliers and buyers were reported by buyers to be the aspect of the SCIs that they least understood. In some instances, this lack of understanding was due to a specific initiative being too new for its impacts to be visible or quantified (e.g. SKF). Sherman et al. (2012) also note that supplier data is often lacking or of poor quality.

In other instances, this information was not disclosed due to



being deemed commercially sensitive. Suppliers may not indicate to the buyer the cost savings associated with implemented SCI measures, in case the buyer then expects to see that saving reflected in a lower product/service price. This conclusion is supported by Sherman et al. (2012), who indicate that this behaviour may be due to split incentives between suppliers and buyers. Some factories are concerned that if they share their success stories of having reduced costs through efficiencies, retailers will ask them to reduce the price of their products. Their concerns may lead them to be reluctant to share data or provide accurate data. In addition, because many factories operate within highly competitive industries and have tight profit margins, sourcing and procurement have become contentious issues between suppliers and buyers, which may result in poor relationships. Additional requirements to take into account environmental or energy issues may not be viewed positively by suppliers, especially if price reductions are implied without any reciprocal assurance of longer-term engagement by the buyer.

To overcome these concerns, retailers can offer incentives such as marketing benefits (e.g. highlighting important suppliers), clearly communicate what the data will be used for, pledge to not negotiate lower prices if suppliers lower their own costs, or work through external platforms (Sherman et al. 2012). For example, retailers can remove confidentiality concerns by using third-party intermediaries to deal with data. Platforms such as EcoVadis, Intertek and Efficiency Exchange (see Appendix) are examples of such entities. Further discussion is provided in section 4.4.

4.2.1 Costs

Suppliers generally bear the cost of identifying and implementing energy-saving measures. This is the case for SKF, Walmart (except for energy audits, see below), Prorail, Suzhou EE Star Scheme, GE, Ford, BASF, British Gypsum and Ikea.

In many cases where external auditors were used, suppliers were also expected to cover the full cost of audits and on-site inspections. However, instances exist (as in the case of GE), where buyer personnel conducted audits and the buyer company bore the entire cost of the verification or audit. Walmart, for example, waives the cost of audits (undertaken by Walmart experts/partners) if the supplier implements the emissions reduction opportunities identified through the audit. Audit costs typically range from \$5,000 to \$10,000 per audit.

In terms of the cost of GHG emissions reduction measures implemented under the SCIs themselves, suppliers generally fund the implementation of measures (although they often do not implement all opportunities identified); they also reap the financial benefits of those measures. The examples reported demonstrated reasonably attractive payback periods for suppliers. For example, in the Supplier Energy Efficiency Program led by Walmart, one of its US suppliers realised energy savings worth \$37,000, with a payback period of four years. This study did not find a specific example where a supplier passed through to a buyer the cost savings from implementing GHG emissions reductions projects in association with an SCI.

4.2.2 Impacts

Where information was available, in the form of specific examples of measures implemented as part of an SCI, all buyers regarded the impact as positive, resulting in both net GHG reductions for the participating installations and attractive payback periods.

Interviews and web-based research brought up a shared list of benefits, both to buyer companies implementing the SCIs and the suppliers participating. These benefits include cost savings through increased energy efficiency, marketing benefits and improved business relationships, and reduced risks related to energy costs and reliability. In China, a further benefit is the potential to gain exemption from rolling blackouts (e.g. Suzhou Energy Efficiency Star scheme). Several examples include:

- **General Electric.** GE noted an impact in one of its supplier companies following participation in the Guangdong EHS Academy. The company increased its energy efficiency and reduced GHG emissions through energy conservation measures and facility upgrades. Between 2009 and 2011, its carbon emissions fell from 752 tons to 610 tons, an improvement of 19%.
- **Ikea.** One of IKEA's suppliers, a glassware company in China, upgraded its furnaces and switched the fuel source from coal to natural gas as a participant in an IKEA and WWF-led carbon reduction project. The company reduced its greenhouse gas emissions by 35% (~7,000 tCO₂-e) between 2009 and 2010. Another textile supplier in Bangladesh, in collaboration with IKEA, identified and implemented a number of efficiency measures in 2011 that reduced energy consumption by 29% and cut CO₂ emissions



by 25%. The annual savings represent 1.1 million euro, and 15,600 tonnes of CO₂.

- **Walmart.** As an example of successful implementation under its SEEP programme, Walmart approached the VonDrehle Corporation, a paper manufacturer in the United States, and undertook an energy audit of its lighting and air conditioning. Following the audit, Walmart replaced the existing lighting with more efficient fluorescent lights (paid for by VonDrehle Corporation), and installed motion sensors on 50% of the lights. As a result, the supplier realised savings of approximately \$37,000 a year. The measure had a payback period of less than four years for VonDrehle.
- **Prorail.** Although a full independent analysis of the results of the scheme is still ongoing, the administrators of the CO₂ Performance Ladder scheme report that participating companies have seen an approximate 2–3% improvement in energy efficiency year on year.

Even the most basic initiatives profiled in this report, which focus on only measuring but not reducing GHG emissions, were regarded as beneficial because the initiatives:

- Provided suppliers and buyers with a better understanding of their relative impact within a product's life cycle or value chain
- Allowed suppliers and buyers to identify ways in which processes could be streamlined and made more effective
- Helped suppliers and buyers to estimate the cost savings that could be achieved
- Increased opportunities for long-term contracts with existing buyers, and helped enable suppliers to anticipate requirements or expectations from other potential buyers, which improved business prospects and opportunities with these buyers (see UNGCNS, 2009).

4.3 Quality assurance, transparency and verification

Reliable data and substantiating claims are key to ensuring meaningful SCI engagement. External verification provides the assurance to buyers that its understanding of supply chain emissions is accurate, while simultaneously providing transparency to investors and other stakeholders that the buyer company is effectively engaging with suppliers.

Different approaches are taken to quality assurance,

transparency and verification, and these differences are related to the scope and ambition of each SCI. As an example, Walmart uses on-site “inspections” within its Supplier Energy Efficiency Programme (SEEP) in the United States. These inspections identify the greatest opportunities for GHG emissions abatement within the supplier facilities that produce Walmart products with the highest embedded carbon. Schemes that claim GHG emissions reductions require the most stringent verification, to avoid accusations of “greenwash” (or unsubstantiated claims). Table 4 summarises the different approaches to such processes undertaken in the ten SCIs.

Companies that place the most emphasis on verification within their SCIs are the consumer-facing, retail organisations such as Walmart, rather than the more business-to-business companies such as SKF. This difference is most likely due to the increased pressure facing retail groups from their customer base, investors and non-governmental organisations. However, many of the retailers are still refining and developing their monitoring and verification strategies, because many suppliers are not as open and transparent as the retailers would like, especially in overseas factories in countries such as China.

The majority of the initiatives incorporate some form of verification of data reported and progress achieved, although detailed information about if/what verification procedures are applied was not readily available. Evidence does indicate that the extent of the verification process can vary significantly. For example, SKF does not require the emissions data reported by suppliers to be verified, although it does hope to incorporate a verification element in the future as the scheme evolves and becomes more complex. On the other hand, Prorail requires all evidence submitted by participants to be externally verified by accredited international verifiers such as Bureau Veritas or DNV. IKEA uses trained IKEA personnel to undertake on-site supplier audits, although the results of these audits and the methodologies applied are in turn audited by external verifiers, who may also in some instances undertake the on-site supplier audits.

Walmart undertakes a variety of SCIs, and varies its verification approach depending on the context of the individual initiative. For example, Walmart accepts on good faith data reported by suppliers as part of the Supplier Sustainability Assessment, but Walmart also warns that suppliers will be penalised if they falsify or wrongly report data. For its Supplier Energy Efficiency Programme (SEEP) and its Supplier GHG Innovation Programme, where actual emissions reductions are claimed, Walmart engages external



consultants to both identify abatement opportunities and to verify the emission savings achieved by the measures implemented. External parties also offer other forms of quality assurance, such as design support and capacity building offered by Intertek as part of its Think Green Initiative.

TABLE 4 Quality assurance requirements

Case study, launch date	Description
SKF	The SKF supplier code of conduct requires suppliers to work towards compliance with the international standard for Environmental Management Systems (EMS) ISO 14001, which includes external certification.
Walmart	As part of the SEEP programme based in the United States, third-party engineering experts undertake the energy audits of supplier facilities. Any emissions reductions claimed as a result of the programme are verified by external parties. Responses to the Supplier Sustainability Assessment are taken on good faith, although suppliers are warned that Walmart takes violation of that good faith very seriously.
CO ² Performance Ladder (Prorail)	A company's level of achievement on the ladder is independently verified by a CO ₂ -Performance Ladder-certifying organisation (selected by the administrator SKAO), such as DNV or Bureau Veritas. Companies are monitored every year to determine whether they are still making progress against their targets. After three years, an external audit must be carried out again, and new targets must be set. The cost of verification depends on the size of the company. Verification costs could be as low as €10,000 for small companies, or as high as €300,000 for large companies.
Suzhou Energy Efficiency Star scheme	Verification of achievement is carried out by a scoring panel of academic experts within the Suzhou Energy Conservation Centre. The verification is desktop, not on-site.
General Electric	GE conducts its own on-site audits, although external parties also conduct some of them. It is not known if all audits are verified.
Ford	Ford requires its suppliers to have ISO 14001 certification.
BASF	BASF's scope 3 emissions (covering supplier emissions that can be allocated to BASF) are verified to the Assurance Engagement standard ISAE 3000 (see Glossary).
British Gypsum	The British Gypsum Purchasing department may undertake audits on an ad-hoc basis to ensure compliance with the Supplier Charter. However, no structured auditing process exists for all suppliers.
IKEA	Trained IKEA personnel undertake audits of supplier facilities. Third-party auditors verify the audits done by IKEA staff (including audit results and process used). These third-party auditors may also sometimes accompany IKEA personnel to conduct the audits.
Home Depot	Intertek provides verification for suppliers (at suppliers' cost), which is part of the overall cost of the TGI programme. The TGI programme includes three phases to ensure that the data is correctly reported. TGI auditors review suppliers' financial and environmental documents, interview facility management and workers, and then conduct an on-site tour to assess and verify if the submitted data is in accordance with the size and nature of the operation.



4.4 Lessons learnt and factors for success

Companies leading the SCIs have undergone a learning process and identified some key factors for success in generating supply chain GHG reductions. Some of the schemes profiled have gone through various stages of evolution, with many of the SCIs having been in place for at least three or four years and the earliest activities beginning in 2000.

4.4.1 Fostering trust and top-management support

Companies need to ensure that value chain partners have a common understanding of the goal of the SCI. This kind of agreement develops trust and is a foundation for achieving shared objectives (WBCSD, 2012). Understanding the goal is one of the main framework steps and key success factors in WBCSD's Value Chain, because WBCSD case studies found it a key foundation to moving forward on value chain sustainability initiatives. Agreement on goal will also ensure the top management within the supplier company is committed to engaging in the SCI, which is critical for its success.

4.4.2 Focussing on a subset of suppliers

The initiatives that feature not just the identification but also the implementation of GHG reduction measures also share the characteristic that they focus on a select group of suppliers rather than the buyer company's entire supplier base to maximise the SCI's impact and reduce administrative burden. Buyers may focus on a subset of highly energy-intensive suppliers and/or highest procurement spend, where impact will be greatest.

Many of the companies leading SCIs (e.g. Walmart and GE) started out assessing the impacts of all their suppliers, but over time have moved towards focussing on a smaller subset of suppliers, reflecting the fact that in most instances the majority of emissions are rooted in a small percentage of a company's supplier base (e.g. of Ford's 1,400 Tier 1 suppliers, 128 of these accounted for ~60% of Ford's 2011 procurement spend).

SKF has also adopted this approach. SKF decided that requiring all of its 10,000 suppliers to report on environmental sustainability criteria would be neither feasible nor effective, and realised that significant resources would be involved in administering a scheme that did include all its suppliers. It therefore decided to focus its supply chain efforts on a narrower group of energy-intensive, major suppliers to ensure that resources could be used as effectively as possible. It now employs a team of technical experts that can assist individual suppliers on an as-needed basis.

Ford works with a select group of "strategic" suppliers representing a large portion of its procurement expenditure across a range of sustainability topics to reduce financial and reputational exposure to these suppliers. British Gypsum currently assesses only its top 100 suppliers against its performance criteria and risk matrix.

4.4.3 Procurement and contractual arrangements

Procurement approaches in which buyers offer a virtual discount on tender prices, as in the case of Prorail through the use of the CO2 Performance Ladder, can benefit companies with an ambitious and proactive approach to environmental sustainability, and can incentivise suppliers to engage more fully on this topic to maintain or increase competitiveness. Policies, codes and standards on environmental/energy performance can also be integrated into the request for proposal (RFP) processes, vendor selection criteria and contracts (CERES, 2010). When specific energy or GHG criteria are integrated into contractual arrangements, a grace period is usually granted to improve and meet the requirements (UN GCNS, 2009).

4.4.4 Environmental and energy management systems

A common feature among the case studies is to require or encourage the implementation of environmental management systems (EMS) (e.g. ISO 14001) within suppliers (e.g. Ford and SKF). Such management systems encourage a consistent and comprehensive approach towards addressing environmental sustainability, raise awareness within the company, and incorporate some of the essential building blocks toward driving GHG reductions, such as regular monitoring of emissions. Standards for energy management systems (EnMS), such as ISO 50001, are a similar tool, focused specifically on energy consumption. Both EMS and EnMS can work well together. BSR (2010) notes that EnMS promotion within SCIs is one of the most promising ways forward and can be linked to purchase orders and shared learning. The US Department of Energy anticipates that ISO 50001 will be an important supplier engagement tool, with programmes such as Superior Energy Performance expected to stimulate supplier adoption of ISO 50001.

EMS or EnMS can offer greater benefits than audits alone, which while being necessary, can be insufficient, and if done poorly, can divert attention away from timely, practical solutions (BSR, 2010). Suppliers are also at risk of receiving different types of audits from many buyers – mostly of a



tick-box nature. For example, GE initially implemented a pilot to embed environmental management systems in suppliers' operations. However, despite a follow-up, many developing country suppliers were unable to meet GE's expectations. At a 2010 Supplier Summit in Shanghai, many participating suppliers spoke of "audit fatigue" and the overall limitations of auditing. As a result of this feedback, as well as other previous experiences, GE therefore decided to adopt a longer-term approach, focusing on improving suppliers' processes, sharing best practice and supporting suppliers to locate resources and tools to help meet GE's expectations. This evolution allows companies to identify some key factors that they believe contribute to more effective supply chain engagement.

Buyers should be encouraged to communicate with suppliers not only of the consequences of non-compliance, but of the potential for capacity development and the potential benefit to their own bottom line that may result from performance improvement (BSR, 2010).

4.4.5 Working in partnership with suppliers using a multi-faceted approach

Although EnMS and EMS are promising tools for supply chain engagement, mandating requirements or EMS/EnMS certification is unlikely on its own to deliver successful supplier engagements. Complementary instruments, such as exploring new solutions and opportunities, sharing best practices and incentives for performance can be important collaboration tools and ways to build trust and open dialogue. One of the key factors for success for realising concrete GHG emission reductions or energy savings appears to involve working in partnership with suppliers on specific programmes to achieve these GHG reductions, so that the buyer can directly influence the activities undertaken.

Almost all of the case studies where GHG emissions reductions are encouraged or required by the buyer do not involve the buyer simply specifying their requirements and "walking away". The companies leading the SCI demonstrate some element of support and partnership to their suppliers through training, capacity building and the provision of resources such as experts or finance to help identify and implement energy-saving opportunities. By working in partnership, buyers can help suppliers to achieve the capacity to continue to generate further emissions reductions on their own.

Buyers can lend the benefit of their own experiences in reducing internal GHG emissions. Leading companies often

offer their efficiency expertise, garnered when focusing on their internal operations strategies, to their suppliers to support replication of those practices (Prindle, 2010). However, as previously mentioned, contracting arrangements between buyers and suppliers can complicate the commitment to long-term action by both parties. Many retailers procure goods via purchase orders, tenders, or trading agents rather than through long-term supply contracts. This approach does not lend itself to long-term collaboration and commitment by buyers to specific suppliers, limiting the lasting impact of SCIs.

Partnering with suppliers and fostering a close relationship helps buyers to better address a range of issues rather than just monitoring a single one. Several of the organisations profiled in this study (British Gypsum and Suzhou Energy Efficiency Star) said that a partnership approach was also preferable, because it helped to boost the relationship between buyer and supplier, and allowed the supplier to better align with the buyer's operational culture and business philosophy. Examples of SCI leaders are working in partnership with suppliers include:

- Walmart helps suppliers to identify what measures can be taken by undertaking on-site inspections.
- Intertek and Suzhou support suppliers at several different stages along the project implementation route through on-site training and workshops.
- SKAO, which administers the CO2 Performance Ladder, also offers support to suppliers by introducing suppliers to experts who can assist in implementing GHG reduction measures.

The specific partnership approach undertaken depends somewhat on the context of the supplier with which a buyer wants to engage. This context includes the current level of GHG emissions abatement activity (e.g. ongoing obligation because of local regulation) or the capacity of the supplier to implement GHG reduction measures, which may be influenced by the region in which the supplier operates. For example, Walmart found that training and support via the EHS Academy was necessary and helpful in China, but has not implemented a similar initiative in the United States, where certain standards of performance and assistance in identifying energy efficiency opportunities have been embedded for some years (e.g. Industrial Assessment Centers).



4.4.6 Multistakeholder collaboration to drive supplier engagement

Individual buyer companies may not have sufficient leverage with their suppliers to influence supplier performance in managing GHG emissions. Therefore sectoral or regional programmes that bring together several stakeholders (local government, industry associations, or groups of buyer companies) can be an effective approach to drive engagement among suppliers. The Guangdong EHS Academy, the Sustainable Apparel Coalition, BSR Energy Efficiency Partnership (see Appendix) are all examples of such collaborations. Through the EHS Academy in China, GE and Walmart provide training to suppliers.

The Suzhou Energy Efficiency Star Program offers an interesting contrast to the other case studies, because it is led, not by a buyer company, but by the municipal government and Suzhou Energy Conservation Centre (SECC). The Suzhou Energy Efficiency Star program, to date, has worked well in getting manufacturers engaged in becoming rated and improving their energy performance levels. However, the visibility to, and interest from, buyers has been limited. Issues have also arisen with buyers who have not yet recognised the label, as well as a lack of alignment with buyers' sustainable purchasing and verification criteria, which presents difficulties for scaling the SCI further. Beginning in 2012, to overcome these issues, SECC, in partnership with the Institute for Industrial Productivity, ICF and the China Chain Store & Franchise Association (CCFA), is engaging with international and local buyers to see whether they are willing to recognize the Suzhou EE star label in their purchasing decisions and policies.

Other government initiatives have been introduced to facilitate buyer and supplier engagement. These initiatives include the US Environment Protection Agency (EPA) Green Suppliers Network (see Appendix 1), whereby the EPA provides programme support and works with large manufacturers to engage their small and medium-sized suppliers in low-cost technical reviews that focus on process improvement and waste minimisation. In California, the Transparency in Supply Chains Act 2010 mandates supply chain reporting for large companies with receipts over \$100 million.

4.4.7 Third-party partnering, tools and facilitation

One clear trend among the most ambitious SCIs is for buyer companies to work with partners such as non-governmental organisations, academic institutions or third-party experts. This trend may not be a demonstrated success factor per se, but none of the more ambitious of the SCIs assessed was being undertaken without the involvement of a non-governmental organisation or academic institution.

For example, IKEA has partnered with WWF on a number of initiatives such as the Developing Climate Positive Opportunities for Suppliers programme and an invitation to companies to propose innovative new emissions reduction solutions to manufacturing processes. Meanwhile GE and Walmart have worked with several partners on their SCIs (e.g. Supplier GHG Innovation Program, Guangdong EHS Academy) in China, such as the World Resources Institute, the University of Arkansas, the Natural Resources Defense Council and the Environmental Defense Fund.

The greater the ambition of the SCI, or the greater the scope, the greater the need for supporting third-party additional resources and expertise to ensure objectives can be met. High-profile NGOs such as those identified in the case studies (WWF, Environmental Defense Fund etc.) can also lend credibility to the efforts of buyers and suppliers to reduce emissions. For example, as part of the CO2 Performance Ladder, participants must set CO2 reduction targets in collaboration with an independent expert (such as an NGO) to ensure that targets are robust and meaningful.

External facilitation tools such as Sedex (see Appendix) offer companies the chance to streamline their response to buyer expectations, via a single credible platform through which to report their sustainability performance. Intertek provides on-site training for Home Depot suppliers, and their services are available to other companies wishing to engage their supply chains. Finally, as previously mentioned, external data collection and facilitation tools (e.g. Efficiency Exchange platforms designed to help suppliers manage and report energy consumption to buyers) can overcome confidentiality and data sensitivity issues while providing confidence to buyers that suppliers are engaging in robust processes.

Advanced SCIs with multiple engagement approaches may also benefit from the input of financial institutions or energy service companies (ESCOs). For example, the Carbon Trust and Siemens Financial Services partnership has recently started an interesting scheme to stimulate energy efficiency investments



in companies (both service sector and industry). The Carbon Trust scheme includes advice to companies on potential energy efficiency measures, a network of reputable suppliers to provide and install such measures, and financing for the measures. The Carbon Trust charges either a fixed price or percentage fee of the savings ultimately realised via the scheme for the service (Carbon Trust, 2012b). IFC assists local financial institutions to offer financing packages and supplier capacity building designed to improve supplier business performance and credit risk, while generating attractive portfolio returns from an untapped market (IFC, 2012).

4.4.8 Successful SCI design features

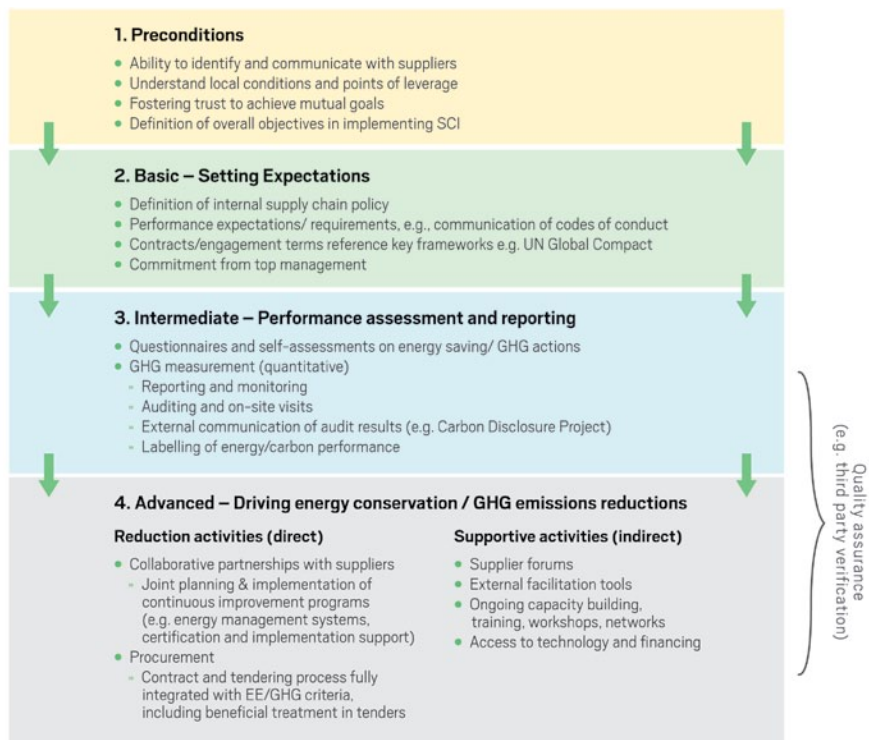
From the features and approaches described above, as well as from an analysis of the literature, the most beneficial SCI approaches combine several complementary elements, such as external platforms, EnMS or EMS, capacity building, and direct financial support and expertise to reduce supplier GHG emissions. Key factors for success include:

- Fostering trust and executive or board-level support and

engagement within the supplier to participate with the supply chain initiative

- Focusing on a select group of suppliers rather than the buyer company’s entire supplier base
- Working in partnership with suppliers on specific programmes to achieve GHG reductions, rather than imposing mandatory requirements
- Combining several complementary elements within an initiative, such as external platforms, auditing, capacity building, direct financial support, and expertise to reduce supplier GHG emissions
- Cumulative, stepwise approaches with increasing ambition
- Third-party partnering, i.e. partnering with external organisations such as non-governmental organisations to provide additional expertise and credibility.
- Figure 3 illustrates the cumulative levels of SCI engagement, demonstrating how SCI activities can build on each other to drive GHG emissions reductions.

FIGURE 4 Levels of SCI engagement towards reducing supply chain GHG emissions





5 Applicability of SCIs to Heavy Industry

This section considers the effectiveness or suitability of SCIs to drive energy or GHG savings directly within heavy industry facilities. For the purposes of this report, heavy industry the following sectors: chemical, petrochemical, non-ferrous metal (including aluminium), non-metallic mineral (including glass and cement), iron and steel, and paper, pulp and printing. This study found a notable lack of specific information on SCIs targeting heavy industrial facilities, even though heavy industrial products are involved (see Table 3).

5.1 Challenges

Understanding the reasons for the challenges of heavy industry SCIs is important in assessing the applicability of some of the approaches identified in the case studies. As seen in the case studies and drawing from SCI lessons across the literature, the chief driver for suppliers to engage in SCIs is the buying power of the downstream company and their motivation to drive down energy costs in their value chains. Consumer-facing companies with high buyer power can easily influence suppliers and implement successful SCIs.

However, with heavy industry, the supply chain characteristics are somewhat different, and the points of leverage are more nuanced. Suppliers from the case studies that most closely fit the description of heavy industry are British Gypsum (which creates plasterboard from supplies of gypsum) and General Electric (whose supply base includes iron and steel producers, chemical producers, and manufacturers of glass, cement, and electronics). Neither of these companies currently requires or encourages GHG emissions reductions, and only requires suppliers to report on their carbon impact (although, in the case of British Gypsum, the level of impact can indirectly increase a supplier's preferred supplier score). These examples, therefore, demonstrate that buyer companies do derive worth from engaging with suppliers and better understanding their supply chain emissions, but do not provide any examples of methods to more proactively drive or require supplier GHG reductions.

Several factors remove some of the buying power of downstream companies that may seek to leverage engagement with their supply chains. Some explanations are offered below, such as commodity markets, lack of direct interaction with the company initiating the SCI, company size, and an existing focus

(by policymakers, industry associations or NGO stakeholders) on direct action with industrial companies. These explanations are not based on concrete evidence from the ten case studies researched. Rather they serve as the basis for further discussion and research.

- **Commodity markets.** A product's origins are generally less visible the lower its value added (e.g. steel slabs), because these products tend to be commoditised (i.e. bought or sold via exchanges) or sold through trading agents. Products with a higher value added and more specialised (e.g. coated aluminium sheets) are generally not as commoditised.
- **Supplier size relative to buyer size.** The buyer companies profiled in the SCIs are all large companies with significant spending power. The suppliers targeted by these buyers are mostly small and medium-sized enterprises (SMEs). Buyer leverage appears to be by far the major driver motivating suppliers to participate in SCIs. This is a point of difference with a heavy industry supply chain, wherein suppliers may have as much influence as the companies downstream the supply chain. (Nuances exist within this statement, of course.) Buyers may also have limited options in terms of alternative suppliers.
- **Supply chain stages.** Many of the companies that initiated the SCIs have done so because they are the more visible consumer-facing companies. However, these companies often do not interact with heavy industry further up the supply chain (where most of the emissions occur or where energy is consumed) but rather interact with intermediate manufacturers. For example, Ford, which arguably would be able to influence aluminium or steel emissions/energy use, may not in fact be able to do so. This is because most of Ford's suppliers (referred to as their Tier 1 suppliers) provide the company with specialised body parts that transform basic materials into value-added parts that may not use energy at the same scale as steel or aluminium plants.
- **Existing drivers.** For some larger heavy industry players (as opposed to industrial SMEs), existing drivers to reduce GHG emissions or energy consumption may be more important,



reducing the role of an SCI. Government policy, competition, high energy costs (as a proportion of all input costs), or direct pressure from investors or NGOs may be stronger drivers than SCIs. As noted by BASF, many heavy industrial companies are so large that they already face immense pressure from NGOs and government to reduce emissions. Many of these larger companies may also be subject to legislative requirements to manage GHG emissions (e.g. EU Emissions Trading System or China's Top-10,000 Energy-Consuming Enterprises program). Hence some industrial market players are already implementing initiatives to reduce the carbon footprint of their own operations, rather than relying on buyers to provide the point of influence.

5.2 Opportunities

With these challenges in mind, possible avenues still exist for SCIs to target the operations and impacts of heavy industrial plants. Some opportunities are offered. For example, industry sector associations are already undertaking a number of initiatives, such as life cycle inventories of industrial commodities. Where substitution threats exist between different heavy industry products (e.g. steel and aluminium), suppliers may be proactive in engaging with buyers to demonstrate the performance of their products over the life cycle.

Buyer companies looking to influence heavy industry suppliers should assess the existing operational performance or "starting point" of their suppliers when deciding what type of activity to engage in and what their incentives might be to participate. For example, heavy industrial companies may have picked the "low-hanging fruit", have mandatory requirements through government policy, or have other drivers at play. R&D SCI models may be relevant for delivering further GHG reductions. Assisting suppliers

with procurement strategies through purchasing or investing in more energy efficient equipment is also another option and may be quite attractive if buyers also match investment opportunities through access to finance, such as IFC's Sustainable Supply Chain finance programme.

For large industrial suppliers, buyer companies wishing to engage heavy industry in GHG reduction activities may also wish to consider establishing consortia of buyers to increase their influence and leverage where needed. Amalgamating stakeholders has already been used to effectively drive supplier engagement; examples include the Guangdong EHS Academy, Sustainable Apparel Coalition, and BSR's Energy Efficiency Partnership.

Buyers should also look at leveraging existing voluntary labelling schemes such as the Suzhou scheme. Although not profiled in this report, voluntary building schemes could be another relevant option. For example, the Green Building Council of Australia awards rating credits for buildings that use steel from a "responsible steel maker", which is one that: 1) is certified according to ISO 14001, 2) is a member of the World Steel Association's Climate Action Plan (a benchmarking scheme); and 3) meets other performance criteria (based on mass and strength).

Approaches similar to the CO₂ Performance Ladder appear to be well suited to engaging heavy industry. Good candidates might be large companies (including state-owned enterprises), with large buying power, that conduct infrastructure and public procurement projects such as rail, roads, and public buildings. In such cases, SCIs could be integrated into system approaches such as low carbon city projects that involve municipalities, public works, the buildings sector, retailers and government policy.



6 Conclusion

The SCIs explored in this paper demonstrate that a range of approaches are being applied to engage with suppliers on GHG emissions and energy efficiency. These approaches range from monitoring and reporting of supplier emissions, to mandatory requirements for suppliers to reduce GHG emissions, to partnership approaches that include a wide spectrum of collaboration and support activities, as described in Table 2.

The paper then proposes successful design features and methods of engagement that should be considered when deciding to develop an SCI. Each of the tools and activities used in the ten SCIs can help to facilitate supplier GHG reductions, although implementation of individual tools in isolation can limit their effectiveness. For example, audits can raise awareness of GHG emissions within a supplier, and provide an understanding of GHG emissions “hotspots”. However, they can also be resource intensive to complete, and if done poorly, they can divert attention away from other measures that will directly drive emissions reductions.

The case studies also show that achieving supplier GHG reductions is a step-by-step process. Before suppliers can begin to plan emissions reductions, they need to quantify baseline emissions to identify best abatement opportunities. A supplier’s starting point is also important; if a company does not have the knowledge or resources to reduce emissions independently, mandatory requirements will not be effective.

Some SCIs develop as cumulative stepwise approaches that increase in comprehensiveness and ambition over time. For example, successful audits can serve as the basis for identifying GHG emissions reduction opportunities, and training and workshops can help to build the capacity needed to exploit these opportunities. An energy management system can provide a useful framework to manage the progress through the different steps identified in Figure 2.

Characteristics of successful initiatives profiled in this study include utilising a partnership approach and support from external parties. Partnership approaches that promote certified EMS, combined with training, support and access to finance, is an example of an effective SCI design combining multiple elements. Although no examples were found in this study, EnMS standards could easily replace or work in combination with EMS to provide a more in-depth framework for improving energy use.

The analysis showed a wide variety of SCI types and intermediaries. This variety demonstrates the willingness and leadership of different market players, but it also highlights the potential difficulties for suppliers that are required to meet a number of different requirements according to each SCI’s expectations. It also poses issues for scalability and replicability of a single SCI model, because each buyer company has its own sustainability goals.

Due to the potential scale and the cost-effectiveness of reducing emissions and saving energy in heavy industry (e.g. cement, iron and steel sectors), SCIs that can influence such suppliers could provide a promising new means of driving energy and carbon efficiency. However, many of the SCIs targeting manufacturing suppliers are actually targeting intermediate manufacturers rather than the heavy industrial companies that make basic materials. As noted by Prindle (2010), where a company sits within the supply chain often affects its motivation and ability to take actions to improve energy efficiency and environmental performance among its suppliers. The make-up and drivers of a heavy industry supply chain (highly commoditised, powerful suppliers, existing incentives and regulation) bring challenges for buyer companies. In addition, buyers of these basic materials are generally not the consumer-facing companies but are the intermediate manufacturers, so the incentives to engage in the first place may not be present.

As mentioned in this report, however, a few examples are available of innovative SCIs targeting heavy industry. For example, the suppliers of Prorail, the agency responsible for the Netherlands’ rail network, which mostly comprise construction materials such as cement and iron and steel, participate in an innovative scheme, the CO2 Performance Ladder, which involves preferential procurement, targets and verification of performance.

A starting point for engaging with heavy industrial companies may be to assess where momentum already exists in reducing GHG emissions. Solitary buyer companies are unlikely to have sufficient leverage to successfully kick-start GHG reductions among suppliers, but regional (e.g. a municipal low carbon city initiative) or sectoral (industry associations) supply chain programmes or policies may be in place that companies could use to consolidate their influence and increase leverage.



In addition, industrial suppliers may be open to working with buyer companies to create GHG emissions reduction solutions if they see clear incentives and reciprocity. Where substitution threats exist, industrial suppliers may be even more proactive in engaging with buyers. Activities of mutual benefit include supporting mechanisms such as EnMS implementation, performance labelling, access to financing, consortia, networks and sharing of best practices.

Many of the SCIs cite China as an area of activity or focus, partially due to many manufacturing suppliers being based in the region and the abatement opportunities present. Support to expand the scope of existing programmes (such as the Suzhou Energy Efficiency Star Scheme) to cover heavy industry and involving large buyers in the design and implementation process could yield better results by allowing collaboration and

sharing of best practice within the region. Linking with existing capacity-building programmes could also be beneficial. A greater need also exists to work with SMEs, as opposed to large companies, because most of the abatement and energy savings potential occurs with these companies.

Facilitating GHG reductions in heavy industrial supply chains may be less about the wide application of generic approaches for a supply chain and more about selecting a nuanced approach based on consideration of the individual suppliers in a buyer's supply chain – including the suppliers' size, capacity and location, as well as buyer company leverage, opportunities to scale the SCI, existing external pressures, and momentum from other SCI activities in the marketplace. Most important is not to consider heavy industry as a whole but to evaluate sub-sector and even company attitudes toward SCI engagement.



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8 Appendix: Supply Chain Resources

Automotive Industry Action Group (AIAG): The Automotive Industry Action Group is a globally recognized organisation founded in 1982 by a group of managers from Chrysler, Ford Motor Company, and General Motors. The purpose of the group is to provide an open forum where members can develop solutions to enhance the prosperity of the automotive industry. AIAG's focus is to continuously improve business processes and practices involving trading partners throughout the supply chain. Under the auspices of AIAG, volunteers from all layers of the supply chain work together to resolve issues affecting the automotive supply chain. <http://www.aiag.org/scriptcontent/index.cfm>

Business for Social Responsibility (BSR) Energy Efficiency Partnership and China Training Institute: Through the Energy Efficiency Partnership, BSR partners with suppliers on energy efficiency. The partnership is a practical way to make suppliers more competitive, while also offering a gateway for companies to manage climate and other supply chain sustainability issues. EEP participants include leading multinational manufacturers, retailers, and consumer products companies, along with more than 70 of their China-based suppliers. BSR also manages the China Training Institute (CTI). CTI is an ongoing initiative that aims to help global buyers and their Chinese suppliers to improve corporate social responsibility (CSR) performance and overall competitiveness through a wide range of training programmes, roundtables, and salons. Since 2004, CTI has delivered more than 140 days of training to more than 1,500 managers in China. www.bsr.org

Carbon Disclosure Project Supply Chain Programme:

The Carbon Disclosure Project (CDP) is an independent not-for-profit organisation working to drive greenhouse gas emissions reduction and sustainable water use by business and cities. It provides a platform for companies and cities around the world to measure, disclose, manage and share environmental information. The CDP runs a Supply Chain Programme in which companies disclose information on the impact of their supply chain and engagement with suppliers to manage this impact. <https://www.cdproject.net/en-US/Programmes/Pages/CDP-Supply-Chain.aspx>

Cement Sustainability Initiative: The Cement Sustainability Initiative (CSI) is a global effort by 22 major cement producers, with operations in more than 100 countries, which believe a strong business case can be made for the pursuit of sustainable development. Collectively these companies account for about one-third of the world's cement production and range in size from very large multinationals to smaller local producers. Members submit benchmarking data using a common protocol (the "Getting the Numbers Right" [GNR] system) to help the cement industry and policymakers alike better assess the influence of kiln technology, fuel selection, plant location and other variables on global and regional plant performance and emissions management <http://www.wbcscement.org/>

China Business Council for Sustainable Development's (CBCSD) '1+3' Initiative: Under this initiative, member companies are expected to train three of their partners in their value chain (e.g. supplier, customer, logistics partner) on CSR issues based on their own experiences. Issues addressed include environmental protection, labour issues, and human rights protection. The three partners are then expected to disseminate the knowledge and practices learned to three further partners within their own value chain, thereby creating a "snowball" effect. <http://english.cbcsd.org.cn/>

EcoVadis: EcoVadis operates a collaborative platform that helps companies to assess the environmental and social performance of their suppliers globally. EcoVadis combines technology and corporate social responsibility (CSR) expertise to deliver simple and reliable supplier scorecards, covering 150 purchasing categories and 21 CSR criteria. Key enabler of a sustainable procurement strategy, EcoVadis ratings help businesses reduce risks, drive performance and support eco-innovation in their supply chain. <http://www.ecovadis.com/website/l-en/home.aspx>

Efficiency Exchange (EEx): EEx is building an innovative technology platform designed to help factories and brands align their unique economic interests toward operating more efficiently. <http://efficiencyexchange.com/verge-dc-by-greenbiz-com/>



Electronics Industry Citizenship Coalition (EICC): EEIC was formed to develop an industry code of conduct, setting standards for social and environmental performance in the electronic industry's global supply chain. Business for Social Responsibility (BSR) serves as secretariat for this coalition, which now includes over 40 members worldwide representing various tiers of the electronic supply chain. The EICC is committed to establishing common assessment tools, improved approaches to auditing, and capacity building and training for suppliers and auditors. It has also developed a common reporting framework. Working groups are focused on particular issues, such as the extractive working group, which is primarily concerned with the metals supply chain. Recognising that this material crosses industry lines, this working group has expanded its multi-stakeholder effort to include other sectors, such as automotive companies (CERES, 2010). <http://www.eicc.info/>

Environmental Defense Fund (EDF): EDF is a United States-based nonprofit environmental advocacy group founded in 1967. The group's headquarters are in New York City, with offices nationwide, and scientists and policy specialists working worldwide. The group works with a number of large multinational companies on a partnership basis to assist these companies in reducing their environmental impact. <http://business.edf.org/projects/walmart>

EPA Green Suppliers Network: See Green Suppliers Network.

Extractive Industries Transparency Initiative (EITI): EITI was established to set a global standard for transparency in oil, gas and mining. This coalition includes governments, companies, civil society groups, investors and international organisations at both the membership and board level. Over 40 of the world's largest oil, gas and mining companies support and actively participate in the EITI process through their local operating companies in participating countries, through international-level commitments, and through industry associations (CERES, 2010). <http://eiti.org/>

Global Social Compliance Programme (GSCP): Launched end of 2006, the Global Social Compliance Programme is a business-driven programme for the continuous improvement of working and environmental conditions in global supply chains. The GSCP was created by and for global buying companies

wanting to work collaboratively on improving the sustainability (social and environmental) of their often-shared supply base. The GSCP provides a global cross-industry platform to promote the exchange of knowledge and best practices in order to build comparability and transparency between existing social compliance and environmental compliance systems. To this effect, the Global Social Compliance Programme is developing a set of reference tools and processes that describe best existing practices and provide a common interpretation of working and environmental requirements and their implementation at the supplier level. <http://www.gscpnet.com/>

Green Suppliers Network: The Green Suppliers Network is a venture involving industry, the U.S. EPA, and the U.S. Department of Commerce's National Institute of Standards and Technology's Manufacturing Extension Partnership (NIST MEP), a leading provider of technical assistance to manufacturers. The Green Suppliers Network works with large manufacturers to engage their small and medium-sized suppliers in low-cost technical reviews that focus on process improvement and waste minimisation. EPA provides programme support. <http://www.epa.gov/greensuppliers/>

Institute for Sustainable Communities (ISC): The ISC has established two Environment, Health and Safety (EHS) Academies to help boost compliance and reduce risk, the first in Guangzhou (Guangdong) in 2008, and the second in Suzhou (Jiangsu) in 2011. These academies will expand the pool of qualified EHS and Industrial Energy Efficiency (IEE) managers serving factories in China. Located in Lingnan (University) College in Guangzhou and in Nanjing University's Research Center in Suzhou Industrial Park the two academies mark the first time that Chinese and U.S. experts from major brands have joined together to create world-class, independent, Chinese-owned and Chinese-staffed EHS training centres. The Guangdong centre was funded by donations from international buyer companies including Wal-Mart, General Electric and Gap. http://www.iscvt.org/where_we_work/china/article/ehs_academy.php

ISO 14001: ISO 14001 is an internationally accepted standard that sets out how you can go about putting in place an effective Environmental Management System (EMS) <http://www.iso14000-iso14001-environmental-management.com/>



ISO 50001: ISO 50001 is an International Standard that lays out the latest best practice in energy management. It was developed by energy management experts from over 60 countries from across the world.. http://www.iso.org/iso/iso_50001_energy.pdf

Sedex: Sedex is a not-for-profit membership organisation dedicated to driving improvements in ethical and responsible business practices in global supply chains. It is a large collaborative platform for sharing ethical supply chain data, helping companies to reduce risk, protect reputation and improve supply chain practices. Sedex aims to ease the burden on suppliers facing multiple audits, questionnaires and certifications and to drive improvements in the ethical performance of global supply chains. <http://www.sedexglobal.com/>

Sustainability Consortium: The Sustainability Consortium is a consortium of multinational manufacturing and corporate firms, which aim to drive scientific research and the development of standards and IT tools that enhance product sustainability. Founding members include Alcoa, BASF, Cargill and Unilever. The consortium works to partner with auditing and certification firms to create assurance standards. <http://www.sustainabilityconsortium.org/>

Sustainable Apparel Coalition: The Sustainable Apparel Coalition is an industrywide group of leading apparel and footwear brands, retailers, manufacturers, non-governmental organizations, academic experts and the U.S. Environmental Protection Agency, working to reduce the environmental and social impacts of apparel and footwear products around the world. <http://www.apparelcoalition.org/>

United Nations Global Compact: The United Nations Global Compact is a strategic policy initiative for businesses that are committed to aligning their operations and strategies with ten universally accepted principles in the areas of human rights, labour, environment and anti-corruption. The Global Compact is a practical framework for the development, implementation, and disclosure of sustainability policies and practices. The Global Compact Office has established an advisory group of participants and stakeholders to develop guidance material on sustainable supply chains. With over 8700 corporate participants and other stakeholders from over 130 countries, it

is the largest voluntary corporate responsibility initiative in the world. <http://www.unglobalcompact.org/>

World Wildlife Fund (WWF) Developing Climate Positive Opportunities for Suppliers: IKEA cooperates with WWF on a number of projects, including to identify and act on opportunities in the entire value chain, from raw material extraction to recycling IKEA products at the end of their life-cycle, and to help our customers become more climate smart. http://www.ikea.com/ms/en_HK/about_ikea/our_responsibility/climate_change/climate_projects_with_wwf.html

World Wildlife Fund (WWF) Low Carbon Manufacturing Programme (LCMP): The Low Carbon Manufacturing Programme (LCMP) aims at reducing carbon emissions generated by manufacturing facilities in the Pearl River Delta (PRD) and developing environmental social governance for those manufacturers. By providing manufacturers with a carbon accounting and labelling system, LCMP helps to measure their effectiveness in reducing carbon emissions and equip them with best practice in greenhouse gas management. http://www.wwf.org.hk/en/whatwedo/footprint/climate/corparctions/corporate_lcmp/ and http://www.ikea.com/ms/en_US/about_ikea/pdf/climate_fact_sheet.pdf

British Gypsum Responsible Sourcing: http://www.british-gypsum.com/sustainability/environmental_sustainability/responsible_sourcing.aspx

Ford Aligned Business Framework: <http://corporate.ford.com/our-company/governance-hub/supply-chain-sustainability-group>

General Electric: <http://www.gecitizenship.com/our-commitment-areas/our-suppliers/> and <http://www.gecitizenship.com/our-commitment-areas/our-suppliers/2010-commitments-and-moving-forward/>

Intertek/Think Green Initiative: <http://www.intertek.com/consumer/auditing/tgi/>

Prorail CO2 Performance Ladder: <http://www.prorail.nl/Zakenpartners/Aanbesteden%20en%20inkoop/Documents/CO2%20taking%20care%20together%20for%20less%20CO2.pdf>



SKF: <http://www.skf.com/portal/skf/home/sustainability>

Suzhou Energy Efficiency Star Program: <http://www.azure-international.com/en/public-outreach/news/189-labeling-energy-efficiency-in-chinas-supply-chains>

Walmart Supplier Energy Efficiency Project: <http://walmartstores.com/Video/?id=1233>

Walmart Supplier GHG Innovation Program: <http://blogs.edf.org/innovation/2494-2/?redirect=walmartghg>



9 Glossary

Carbon Footprinting: The total set of (GHG) emissions caused by an organization, event, product or person. Different methodologies exist. For example, the PAS 2050 is a methodology developed by the Carbon Trust and others to calculate value-chain footprinting.

Greenhouse gas: International climate negotiations focus on the impacts of six gases that warm the planet. The gases are carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydro fluorocarbons (HFCs), perfluorocarbons (PFCs), and sulphur hexafluoride (SF₆). Emissions of these greenhouse gases are usually expressed in terms of the global warming intensity of carbon dioxide.

Heavy industry: For the purposes of this report, heavy industry is defined as the chemical, petrochemical, non-ferrous metal, non-metallic mineral, iron & steel, and paper, pulp and printing sectors. These sectors are defined and categorised as per the International Energy Agency's energy balance categories.

ISAE 3000 standard: Assurance Engagements Other Than Audits or Reviews of Historical Financial Information

The standard by the International Federation of Accountants (IFAC) provides requirements and guidance on assurance engagements, other than audit or reviews of historical financial information. It is a principles-based standard that is capable of being applied effectively to a broad range of underlying subject matters, and that will provide a basis for current and future subject-specific ISAEs. <http://www.ifac.org/publications-resources/isae-3000-revised-assurance-engagements-other-audits-or-reviews-historical-fi>

PAS 2050 A methodology and standard developed by the Carbon Trust and others to calculate value-chain footprinting. See <http://www.bsigroup.com/en/Standards-and-Publications/How-we-can-help-you/Professional-Standards-Service/PAS-2050/PAS-2050/>

Scope 1 emissions: All direct GHG emissions.

Scope 2 emissions: Indirect GHG emissions from consumption of purchased electricity, heat or steam.

Scope 3 emissions: Other indirect emissions, such as the extraction and production of purchased materials and fuels, transport-related activities in vehicles not owned or controlled by the reporting entity, electricity-related activities (e.g. transmission and distribution losses) not covered in Scope 2, outsourced activities, waste disposal, etc.

Supply chain: A supply chain is a system of organisations, people, technology, activities, information and resources involved in moving a product or service from supplier to customer. Supply chain activities transform natural resources, raw materials and components into a finished product that is delivered to the end customer.

Tier 1 and 2 suppliers: Tiers is a term to describe the different stages of material transformation that are involved across the supply chain - from raw materials extraction to final consumption by the end user. Tier 1 suppliers are the direct suppliers of a company, whereas Tier 2 suppliers are situated further upstream, and are the suppliers of Tier 1 companies.

Value chain: A value chain is similar to a supply chain but also includes the parties downstream of an organisation; these can include retailers, final consumers and waste management companies that dispose of products at the end of their life cycle.



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info@iipnetwork.org | [Twitter.com/iipnetwork](https://twitter.com/iipnetwork)