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Global Footprint Network
Advancing the Science of Sustainability

The import of CO_2 emissions from China and India

Sweden's contribution to reduction of CO_2 emissions - a global dimension

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WORDS

"Sweden must be proactive in bringing about strategic energy cooperation among the EU, China and India with the aim of supporting their efforts to limit their emissions of greenhouse gases."

Statement of Government Policy presented by
Prime Minister, Mr Fredrik Reinfeldt, to the Swedish Riksdag (Parliament)
Friday, 6 October 2006[1]

FACTS

"China is now the world's fourth largest economy and growing very fast. India's economic salience is also on the rise. Together these two countries will profoundly influence the pace and nature of global economic change"

Dancing with Giants: China, India, and the Global Economy, World Bank, 2007

ACTIONS?

The Swedish Government 2007-2009

Summary: The key findings and recommendations

WWF is continuing the work to support the development of Sweden as a globally sustainable energy actor. As a first step after the election, where the new government promised to support a sustainable energy development in China and India, WWF asked the Global Footprint Network[2] to calculate the amount of CO_2 that is imbedded in the goods that Sweden import from China and India.

The research by the Global Footprint Network team, Alessandro Galli, Justin Kitzes, Mathis Wackernagel, showed that the import from China is equivalent to roughly 3 500 000 tonnes CO_2 and the import from India is equivalent to 1 200 000 tonnes CO_2. ***The combined amount of CO_2, 4 700 000 tonnes, from these two countries alone are equivalent to approximately nine percent of Sweden's total domestic CO2 emissions.***[3]

A simplistic response to this challenge would be to say that Sweden should reduce the import from China and India. However this is neither realistic nor strategic. ***China and India are already today global factories and the CO_2 imbedded in the goods they export to the world is 3 381 000 000 tonnes. That is approximately the equivalent to 64 times the Swedish domestic CO_2 emissions.*** The export from China and India will continue to grow as their economies grow. The question is what direction these two economies will take, if it will be an energy inefficient and high carbon development path or if it will be an energy efficient and low carbon development path. The development path will to a significant degree will depend on the demand from countries that import the goods produced in these countries.

Right now global energy use is increasing rapidly, with demand expected to increase more than 50 percent by 2030 if current trends continue.[4] With China today the world's second largest consumer of energy, India the sixth and the Asia-Pacific region predicted to consume more than one-third of the world's energy by 2020,[5] political and business leaders must realise the importance of cooperation, support and new strategic alliances in the field of energy and beyond

Through EU Sweden has a unique opportunity to collaborate with both China and India. In 2006 China remained EU's second biggest trading partner (after the US) and, according to China's statistics, the EU is China's first trading partner (ahead of the US and Japan).[6] The European Union also remains India's largest trading partner, accounting for 21.77% of India's exports and 18.33 per cent of total Indian imports in the year 2003-04.[7]

With the emergence of China and India as global super powers it is necessary to approach the import from China and India, not as a climate problem, but as both a climate and economic opportunity. If Sweden through strategic actions can support a situation where China's and India's export becomes less carbon intensive a lot could be gained. In order to make this happen Sweden should first of all develop a strategy to support the efforts of China and India to limit their emissions of greenhouse gases. This is already something that Sweden has pledged to do.

> "Sweden must be proactive in bringing about strategic energy cooperation among the EU, China and India with the aim of supporting their efforts to limit their emissions of greenhouse gases."
> Statement of Government Policy presented by
> Prime Minister, Mr Fredrik Reinfeldt, 6 October 2006[8]

This focus and pledge is unique in the world to WWF's knowledge and it is something that WWF strongly support. However, so far WWF have not seen any concrete proactive action to

make this happen. WWF would like the Swedish government to clarify who the responsible person for this is and what resources are available, both in money and personnel.

Instead of action it seems as if the global perspective sometime is used to polarise between domestic focus and focus in China/India. This polarisation, supported by many different actors that for different historic reasons seem to prefer national or international investments, is something WWF find deeply troubling. If we are to address the global challenge of Climate Change in an equitable as well as cost efficient way we need to think and act with a global strategy. This will require that the Swedish Government link domestic actions with international initiatives. It can not be approached as a question of "either or", but how domestic and international actions should be combined to deliver the reductions needed to stay below a 2°C increase in temperature (not only to meet the Kyoto commitments that are only a small step, but all too often the only focus), deliver energy security and maximum business opportunities. WWF see two key areas that must be addressed

The first area: Improve the climate quality of the import from China and India. This would happen if the government developed and implemented a strategy for sustainable import where tools like public procurement, distribution of relevant information about the needs in Sweden and support for progressive supply chain management are used to support leading companies in China and India. Sweden and Swedish companies could then play an important and strategic role in supporting their efforts to limit their emissions of greenhouse gases. It is important that these policies are developed in dialogue with China and India to ensure that it will support these countries development. In China the targets for energy efficiency and renewables in the 11th five year plan provide a very good starting point.[9]

It is also important that Sweden work through EU to ensure support and multiplication of the above measures. Therefore the targets for Swedish CO_2 import should also be formulated and achieved in order to ensure a multiplication effect. Sweden should not focus on the Swedish import from China/India alone but the import of other countries, especially in EU, from China/India.

The second area: Review the climate quality of the export to and investments in China/India. Here it is important to move away from the traditional definitions of environmental goods and services.[10] Focus should be on how a low carbon development can take place and a resource efficient infrastructure created. Methods to calculate CO_2 in the export should immediately be developed. Both for export of energy intensive goods such as paper and steel, where Sweden is a significant exporter, and for new solutions in urban planning that reduce CO_2 emissions, this can include everything from buildings to ICT solutions. With regards to the first area SCB has already produced an interesting report that could be used as a starting point.[11] For the second area, an overview of potential products and services that could be of interest already exists in earlier studies.[12]

In order to become proactive in bringing about strategic energy cooperation among the EU, China and India WWF recommends the Swedish government to, before summer 2007, implement a ten point programme for climate innovative trade and investment. This might be ambitious by Swedish traditional standards, but it is only a first step to a serious strategy to address the climate challenge.

Ten point programme: An innovative trade & foreign policy for sustainable energy solutions
1. Improve the climate quality of the import from China and India (see above).

2. Review the climate quality of the export to and investments in China/India (see above).
3. Initiate six-eight collaboration projects with China and India with the aim to develop sustainable energy solutions.
4. Support twelve strategic projects in China and India. These should reduce the emissions in these two countries with the equivalent of at least ten percent of Sweden's emissions.
5. Collaborate with at least three leading Swedish companies to develop support for export of sustainable energy solutions.
6. Create a fund, minimum 250 million SEK, that will be used to support sustainable energy solutions.
7. Support the creation of twin-cities in Sweden and China/India where collaboration and implementation of sustainable energy solutions is the goal.
8. Review the possibilities to change in investment criteria for pension funds (especially AP 1-4 + AP6 of the five "buffer funds" plus AP7 in the Swedish pension system.)
9. Ensure the implementation of at least 12 strategic investments and initiatives, including fiscal reforms, administrative changes and subsidies, in Sweden that support companies that later can export sustainable energy solutions.
10. Evaluate Swedish trade and investments in sustainable energy solutions though the implementation of a system that can calculate the CO2 effects of export to/import from and investments in/from China/India.

All of the above measures should be developed in collaboration with China and India as well as EU and other relevant actors.

Methodology
For the calculations, Global Footprint Network considered the tonnage of various categories of products flowing from China and India to Sweden. Global Footprint Network multiplied 600+ product flows (tonnes) by world average energy intensity of each good (gigajoules per tonne) and the country-specific carbon intensity (tonnes CO2 per gigajoule).

The energy intensities come from the International Energy Agency (data.iea.org). These energy intensities reflect the average carbon efficiency (or inefficiency) of electricity and heat production in China and India (e.g., that electricity in China and India have a higher CO2 emission per kilowatt hour than other nations). The use of the world average energy intensity, however, means that we are not capturing the relative efficiency of inefficiency of industrial production (e.g., that it may take more energy to make a product in China than it does elsewhere the world). To the extent that energy efficiencies of production in China and India are lower than the world average, this method may result in an underestimation of the total embedded CO2.

In a more detailed analysis, country-specific energy intensities in addition to the country-specific carbon intensities would be used.

Data sources are International Energy Agency (data.iea.org) for carbon intensities, an internal GFN database for the energy intensities (collected over the years and currently published in the National Footprint Accounts), and UN Statistics COMTRADE for the product flow weights.

2003 is the most current year available, as there is a few year time lag in how frequently the COMTRADE database releases finalized numbers. 2003 is also the most recent year that Global Footprint Network has calculated its National Footprint Accounts.

BACKGROUND

The situation: The rise of China and India

> China and India. Rarely has the economic ascent of two still relatively poor nations been watched with such a mixture of awe, opportunism, and trepidation. The postwar era witnessed economic miracles in Japan and South Korea. But neither was populous enough to power worldwide growth or change the game in a complete spectrum of industries. China and India, by contrast, possess the weight and dynamism to transform the 21st-century global economy.
>
> Businessweek, A New World Economy, August 22, 2005

The word is changing fast and two new economic superpowers, China and India, have emerged as leading actors on the world scene. Or to be more correct, re-emerged, as China was the world's largest economy until 1820.[13]

In the recent past, much of the discussion regarding China's and India's role in the global economy has been in the context of the countries as competitors.[14] From a sustainability perspective the most important question, of course, is not whether China or India will emerge as the more dominant economy, but rather how these two emerging superpowers can contribute to the goal of sustainable development?[15] Three areas are important in this regard, first how China and India can support a sustainable development on their own, second how they can work together and third how, in collaboration with the rest of the world, their rapid development in different ways can contribute to global sustainability.

Significant investments in infrastructure are planned in both countries the coming year, but many of these investments are planned to follow unsustainable western development models that are resource inefficient and incapable of delivering an equitable welfare distribution.[16]

Over the next decade it can be assumed that the economic focus will gradually shift from the current dominant economies of the EU, Japan and the US, to the China-India axis as these countries become economically more powerful. The direction in which China and India moves is therefore set to significantly influence the movement of the world economy as a whole.[17]

In every country, energy policy and the investments which occur in the energy sector, are closely linked to issues such as climate change, local pollution, welfare creation, national security and public participation in key decisions. The manner in which such policies are formulated and implemented will therefore play a significant role in shaping the society.

The increasingly prominent role of the private sector in the global economic arena also raises the question of how the business focus can be shifted. The focus need to shift from mitigation of environmental impacts through implementation of minimum standards, to the promotion of corporate leadership and solutions that deliver the sustainable goods and services the world requires. Instead of incremental improvements of existing technologies we must ask how the services we need can be provided within the carrying capacity of the planet.

The focus: Sustainable urbanisation

> The world does not have the resources for another 5 billion people or so to behave the way that Americans do today.
>
> The Economist, A survey of the world economy, September 16, 2006

Midway through the first decade of the 21st century, the world is rapidly approaching a situation where, for the first time in human history, more people will live in cities than rural areas.[18] Exactly when this point will be reached is unclear, but it is estimated that humanity is likely to cross this historic threshold sometime during 2007.[19]

Over the coming decades, virtually all of the population growth in the world will take place in urban environments, resulting in a situation where approximately two billion additional people will live in cities by 2030.[20] As a result, the demand for investment in urban solutions that can improve quality of life without consuming excessive natural resources will increase over time. Parallel to this trend, global energy use is increasing rapidly, with demand expected to increase by more than 50 percent by 2030 if current trends continue.[21]

With China being the world's second largest consumer of energy, India the sixth and the Asia-Pacific region predicted to consume more than one-third of the world's energy by 2020,[22] political and business leaders realise the importance of cooperation, mutual support and the formation of new strategic alliances in the field of energy solutions and beyond.[23]

In China the urbanization rate currently stands at 1.4 per cent, which means that about 20 million farmers become urban residents each year. This is four times the Swedish population, or a third of the UK population. At this pace, the country's rate of urbanization will reach 55-60% by 2020. That means up to 60% of its projected 1.5 billion 2020 population, or 900 million people, will live in cities. Currently, about 30% of the 1.3 billion Chinese dwell in cities - about 390 million people.[24] Chinese cities and towns are expected to absorb about 300 million people from rural areas in 20 years if the urbanization drive maintains a growth of 1 per cent annually. [25] This is equivalent to the whole US population or more than twice the population of Japan.

In India the number of "million plus" cities increased from 5 in 1951 to 23 in 1991 and to 35 in 2001. About 37% of the total urban population live in these million plus cities.[26] Today India has 286 million people living in over 5000 cities and towns with over 40 per cent of them living in 60 metropolitan urban agglomerations. There are 62 million urban people living in slums and squatter settlements today. It is projected that urban population of India will grow to 468 million by 2020.[27]

The way China and India invest in new urban solutions will drive technology development and institutional innovation not only in the two countries but globally. In the case of energy it is important to ask what steps that are required in order to move beyond mere incremental improvements in efficiency and reduced emissions in the power sector, to the implementation of innovative and sustainable approaches such as technology-based alternatives to business travel and new urban planning models?[28]

The issue: Sustainable energy solutions

> On current trends, we are on course for a dirty, expensive and unsustainable energy future," IEA Executive Director Claude Mandil said at the report's launch in London. "In response, urgent government action is required. The key word is urgent.
>
> International Herald Tribune, November 7, 2006.

> The old energy economy is well-organized, well financed, and politically influential. The new energy economy is entrepreneurial and decentralized, undercapitalized, and lacks substantial political power. Yet its economic potential is enormous. How do we tap it?
>
> Clinton Global Initiative, September 15-17, 2005

Saving energy, or to be precise increasing energy efficiency and finding new innovative system solutions, has been identified as a strategic priority by WWF. About half of the solution to stay below 2°C global warming by 2050 can according to WWF be delivered via the much more efficient use of the energy we use. Technically about 90-95% of all primary energy, and thus carbon emissions, could be saved while providing same services and benefits if only the most efficient and best available technologies could be deployed. Efforts to make energy use more efficient provide triple dividends by promoting social development, enhancing competitiveness, and delivering energy security.

Since many of the existing barriers to a widespread dissemination of efficient technologies are regulatory, educational and financial but not technological, setting the right economic incentives and establishing an appropriate policy and regulatory framework is essential. Enhanced energy efficiency and energy conservation therefore must be promoted as a pre-condition for any sustainable energy future.

Today energy and solutions markets are segmented by sector and region, but globalisation is increasingly making efficiency a matter of international cooperation. Still, even if key economies like the leading innovators in OECD, China and India will drive global decision making, implementation remains largely a matter of national choice.

The perspective: Turning challenges into opportunities

> "The poor as a market are 5 billion strong. This means that solutions that we develop cannot be based on the same patterns of resource use that we expect to use in developed countries. Solutions must be sustainable and ecologically friendly."

> "The goal here is not to be alarmist. The BOP [Bottom of the Pyramid, where five billion people live] will force us to come to terms with the use of resources in ways that we have not so far. Whether it is in use of fossil fuels for energy and transportation, water for personal cleanliness, or packaging for safety and aesthetics, ecological sensitivity will become paramount. I believe that more innovative, sustainable solutions will increasingly emerge from serving the BOP markets than from the developed markets."
> C.K. Prahalad, The fortune at the bottom of the pyramid

Today most environmental challenges are seen as problems and costs by business and politicians. In order to solve the climate challenge it is necessary to question this perspective. It is not possible to treat the climate challenge in the same way as many other environmental challenges have been dealt with. For many other challenges technology solutions has been available that has been possible to implement after initial resistance from the industry creating the problem. Lead-free gasoline, chlorine free paper, phase-out of CFC, reduction of SO_2-emissions, etc all have one thing in common, the companies creating the problem could through extra investments address the challenge though quite simple technology already available.

With Climate Change it has not proven successful to ask the energy companies to solve the problem. Most of them are stuck in a supply driven approach that they are unable to get out of, at least as quick as necessary. The solutions needed also involve more significant changes in society and thereby also include many more actors. Therefore new sectors must be involved. Instead of looking how energy companies can reduce their emissions, something that seems to lead to few places beyond research in capture of CO2 and more nuclear power, a demand side focus must be the starting point.

WWF will explore innovative ways of promoting integrated solutions that move beyond the supply- and demand-side management issues dominating current western discussions. In this regard, WWF will explore solutions which for example allow buildings to become net producers of energy, and allow businesses to move from being large consumers of electricity to being self-sufficient. Furthermore, WWF would also support companies that provide comprehensive low-energy solutions for cities and key industries. The type of solutions in which WWF is interested, will require collaboration between actors such as city planners, construction companies, IT companies, renewable energy providers and the financial sector.

In all cases, companies will be encouraged to demonstrate that the business models proposed can be profitable, either today under current rules and regulations, or if supported by new rules and regulations that they support. The goal is to ensure that we stay below a 2°C increase in global temperature, while at the same time phase out polluting and unsustainable energy solutions.

In order to achieve sustainable energy development, the framework that regulate investment in urban areas need to support, rather than undermine, companies that can provide solutions to the challenges of today. For China and India this is not only a matter of satisfying domestic demand in this regard, but also the opportunity to become a key exporter of sustainable goods and services.

Goods and services that help reduce resource use and support sustainable energy solutions should be given priority in all regulation. Rich countries together with China and India should also develop a joint strategy to reach sustainable consumption and production patterns, where the rapid change in China and India is used as an opportunity to develop sustainable energy solutions, not only for India and China but for the world as well.

Appendix 1
CO_2 embodied in trade from China and India to Sweden (2003)

Exporter	Importer	Embodied energy in export (GJ/yr)	National Carbon Intensity (gCO_2/KWh)	Conversion Factor (KWh/GJ)	National Carbon Intensity (gCO_2/GJ)	CO_2 embodied in trade (gCO_2/yr)	**CO_2 embodied in trade (tCO_2/yr)**
China	**Sweden**	16 363 000	770	278	214 060	3,5027E+12	3 502 664
India	**Sweden**	4 870 000	910	278	252 980	1,2320E+12	1 232 013
China	**World**	13 395 805 000	770	278	214 060	2,8675E+15	2 867 506 018
India	**World**	2 031 430 000	910	278	252 980	5,1391E+14	513 911 161

List of top 5 traded products for amount of embodied energy and CO_2 emitted

	% of total exported CO_2 to Sweden
China to Sweden	
Articles of artif. plastic materials, nes.	14%
Furniture	13%
Lighting fixtures and fittings and parts	10%
Clothing and accessories, knitted or crocheted	3%
Nuts, bolts, screws, rivets, washers, etc.	3%
India to Sweden	
Clothing and accessories, knitted or crocheted	30%
Clothing of text fabric, not knitted crocheted	14%
Clothing accessories of text.,not knitted/croch	6%
Other carpets, carpeting and rugs	6%
Made up articles of textile materials, nes	6%

Source: The Global Footprint Network, Calculation from WWF Sweden (February 2007)

Appendix 2
Export to India from Sweden

T R A D E P R O F I L E

INDIA

	2003	2004	2005	Jan-June 2005	Jan-June 2006	Change 2006/ 2005%
SWEDISH EXPORTS (SEK 1000)	7 111 140	8 296 143	6 969 379	3 478 760	4 934 336	42
SHARE OF TOTAL SWEDISH EXPORTS (%)	0,9	0,9	0,7	0,7	0,9	
FOOD	4 689	6 135	4 866	3 105	3 364	8
RAW MATERIALS; FUELS	242 055	163 494	419 880	146 053	238 327	63
WOOD	29	176	527	282	255	-10
PAPER PULP	47 876	69 498	209 500	76 236	132 328	74
ORES	187 883	86 568	203 148	65 123	101 849	56
FUELS	1 292	1 053	935	827	1 424	72
CHEMICAL PRODUCTS	227 594	285 250	285 197	134 479	195 139	45
PHARMACEUTICALS	23 620	8 976	21 158	14 793	7 197	-51
SEMI-MANUFACTURES	619 323	747 876	962 281	544 022	604 379	11
PAPER AND BOARD	196 387	181 629	180 999	84 941	112 100	32
WOOD MANUFACTURES	3 449	6 378	7 203	3 278	3 905	19
PREFAB BUILDINGS	0	6 358	7	0	4	
IRON AND STEEL	328 240	435 080	644 151	394 039	403 537	2
NON-FERROUS METALS	42 969	70 773	70 469	34 623	39 498	14
ENGINEERING PRODUCTS	4 965 055	5 542 284	4 114 033	1 896 514	2 911 988	54
TOOLS	45 189	44 783	39 318	16 771	23 774	42
MANUFACTURES OF METALS.N.E.S	29 938	36 412	46 786	12 631	26 549	110
POWER GENERATING MACHINERY	77 349	171 162	189 015	96 135	100 729	5
AGRICULTURAL MACHINERY	4 300	7 017	3 698	1 882	1 526	-19

CONSTRUCTION AND MINING MACHINERY	60 491	72 771	73 761	43 924	112 294	156
PAPER AND PULP MILL MACHINERY	31 358	44 410	25 967	13 470	19 776	47
MACHINES FOR SPEC INDUSTRIES N.E.S	113 021	126 793	144 192	53 073	81 185	53
METAL-WORKING MACHINERY	43 183	82 188	154 776	46 578	62 861	35
HEATING AND COOLING EQUIPMENT	63 180	74 405	124 193	58 921	65 397	11
PUMPS AND CENTRIFUGES	22 505	33 622	52 254	27 970	24 568	-12
MECHANICAL HANDLING EQUIPMENT	88 695	64 119	87 771	41 663	90 941	118
PNEUMATIC ETC HAND TOOLS	1 544	1 358	1 444	897	918	2
BALL OR ROLLER BEARINGS	18 650	37 673	61 010	34 024	43 255	27
NON-ELECTRICAL MACHINERY N.E.S	49 410	76 943	115 042	66 384	81 775	23
OFFICE MACHINES, ADP EQUIPMENT	30 466	35 537	82 622	37 862	81 878	116
TELECOMMUNICATIONS APPARATUS	3 469 245	3 842 990	2 189 575	1 058 216	1 632 743	54
EQUIPMENT FOR DISTR ELECTRICITY	625 895	512 283	303 601	98 981	250 394	153
APPARATUS FOR DOMESTIC USE	1 447	928	1 239	590	734	24
MEDICAL INSTRUMENTS, APPARATUS	18 612	27 968	56 242	15 083	18 273	21
ELECTRICAL MACHINERY N.E.S	40 005	25 284	34 789	5 243	8 107	55
PASSENGER CARS	1 803	1 593	2 965	1 672	459	-73
LORRIES, TRUCKS AND BUSES	1 376	0	13 975	4 349	5 233	20
PARTS FOR MOTOR VEHICLES	68 057	138 569	177 939	89 471	116 093	30
SHIPS AND BOATS	0	0	0	0	9	
TRANSPORT EQUIPMENT N.E.S	6 405	7 399	1 906	798	2 144	169
SANITARY ETC. AND LIGHTING EQUIPMENT	207	214	531	249	3 508	
SCIENTIFIC ETC. INSTRUMENTS	50 959	73 766	125 616	68 352	52 534	-23
OTHER MANUFACTURED GOODS	1 052 424	1 551 105	1 183 123	754 586	981 138	30
FURNITURE	11 406	1 656	734	233	1 594	584
CLOTHING	2 629	674	553	188	1 858	888

Source: The Swedish Trade Council, http://www.tradeprofiles.swedishtrade.se/default.asp?id=53

Appendix 3
Export to China from Sweden

T R A D E P R O F I L E — CHINA

	2003	2004	2005	Jan-June 2005	Jan-June 2006	Change 2006/ 2005%
SWEDISH EXPORTS (SEK 1000)	18 133 371	19 023 818	18 849 458	8 719 410	11 040 612	27
SHARE OF TOTAL SWEDISH EXPORTS (%)	2,2	2,1	2	1,9	2,1	
FOOD	39 100	71 838	128 964	55 561	65 702	18
RAW MATERIALS; FUELS	621 746	1 019 521	1 043 113	481 385	734 380	53
WOOD	32 530	58 280	73 991	35 155	56 194	60
PAPER PULP	385 759	536 500	497 822	267 313	344 704	29
ORES	169 602	393 835	437 325	168 884	309 570	83
FUELS	1 476	943	8 109	576	5 525	859
CHEMICAL PRODUCTS	954 919	1 063 353	1 197 229	525 447	805 752	53
PHARMACEUTICALS	396 046	270 036	258 969	131 942	196 105	49
SEMI-MANUFACTURES	2 801 566	2 798 869	3 472 295	1 883 389	2 029 456	8
PAPER AND BOARD	1 112 870	1 340 362	1 419 735	744 131	708 287	-5
WOOD MANUFACTURES	48 399	25 287	21 123	6 775	6 412	-5
PREFAB BUILDINGS	18 308	0	391	0	716	
IRON AND STEEL	1 390 835	1 155 153	1 725 127	989 172	1 073 440	9
NON-FERROUS METALS	46 646	87 965	89 841	48 013	116 264	142
ENGINEERING PRODUCTS	13 325 891	13 743 906	12 721 194	5 655 059	7 196 790	27
TOOLS	85 088	51 376	37 634	20 516	18 554	-10
MANUFACTURES OF METALS.N.E.S	134 313	134 483	112 626	50 169	48 165	-4
POWER GENERATING MACHINERY	642 943	920 365	748 984	367 693	449 265	22
AGRICULTURAL MACHINERY	243 023	102 207	59 374	33 074	54 857	66
CONSTRUCTION AND MINING MACHINERY	337 942	295 883	363 691	116 719	205 909	76

PAPER AND PULP MILL MACHINERY	482 203	680 360	289 561	126 211	186 079	47
MACHINES FOR SPEC INDUSTRIES N.E.S	653 398	877 037	727 947	293 284	286 304	-2
METAL-WORKING MACHINERY	283 631	269 730	353 148	167 342	202 567	21
HEATING AND COOLING EQUIPMENT	440 204	389 991	383 998	177 855	284 779	60
PUMPS AND CENTRIFUGES	257 070	181 528	266 501	101 122	160 595	59
MECHANICAL HANDLING EQUIPMENT	278 491	486 939	824 501	399 702	476 509	19
PNEUMATIC ETC HAND TOOLS	8 888	6 386	12 507	4 333	6 342	46
BALL OR ROLLER BEARINGS	128 665	173 665	319 262	181 531	180 323	-1
NON-ELECTRICAL MACHINERY N.E.S	554 996	588 468	681 095	279 081	576 667	107
OFFICE MACHINES, ADP EQUIPMENT	113 345	138 508	98 508	35 426	46 391	31
TELECOMMUNICATIONS APPARATUS	3 648 284	4 794 816	3 406 273	1 714 962	1 842 698	7
EQUIPMENT FOR DISTR ELECTRICITY	2 621 835	1 381 759	1 977 084	735 540	825 130	12
APPARATUS FOR DOMESTIC USE	36 934	15 239	17 975	6 940	17 950	159
MEDICAL INSTRUMENTS, APPARATUS	183 505	201 243	159 053	73 285	67 885	-7
ELECTRICAL MACHINERY N.E.S	415 003	337 700	392 337	145 367	197 032	36
PASSENGER CARS	226 799	222 762	380 537	189 120	184 381	-3
LORRIES, TRUCKS AND BUSES	576 719	433 676	467 408	155 063	212 855	37
PARTS FOR MOTOR VEHICLES	579 862	382 677	219 449	115 803	282 007	144
SHIPS AND BOATS	0	15	3 701	3 701	263	-93
TRANSPORT EQUIPMENT N.E.S	146 527	341 533	27 059	5 791	142 371	
SANITARY ETC. AND LIGHTING EQUIPMENT	2 822	1 857	5 629	2 715	1 372	-49
SCIENTIFIC ETC. INSTRUMENTS	242 249	329 186	380 827	152 080	238 236	57
OTHER MANUFACTURED GOODS	390 149	326 330	286 664	118 569	208 532	76
FURNITURE	26 963	20 104	17 824	8 135	23 341	187
CLOTHING	5 572	7 035	7 275	3 792	4 738	25

Source: The Swedish Trade Council, http://www.tradeprofiles.swedishtrade.se/default.asp?id=27

[1] http://www.sweden.gov.se/content/1/c6/07/15/51/71d8a385.pdf
[2] http://www.footprintnetwork.org/

[3] Calculations based the official numbers from the Swedish Environmental Protection Agency. http://www.naturvardsverket.se/dokument/klimat/1320.shtml
[4] http://www.iea.org/Textbase/nppdf/free/2006/Key2006.pdf
[5] Manning, Robert A., "The Asian Energy Market: A New Geopolitics?", *Asian Energy Markets dynamics and trends*, Abu Dhabi: Emirates Center for Strategic studies and Research, 2004, p.31
[6] trade.ec.europa.eu/doclib/docs/2006/september/tradoc_122531.pdf
[7] http://www.delind.cec.eu.int/en/trade/trade.htm
[8] http://www.sweden.gov.se/content/1/c6/07/15/51/71d8a385.pdf
[9] Currently 7.5 percent of China's energy comes from renewable sources. The country's aim is to make this 10 percent by 2010 and 16 percent by 2020 and the energy consumption of per unit GDP will be lowered by 20%.and See: http://english.gov.cn/2006-03/23/content_234832.htm and http://www.china.org.cn/english/news/186171.htm
[10] For a discussion about environmental goods and services from a Indian/Chinese perspective see "Indian companies in the 21st Century" assets.panda.org/downloads/wwf_report___indian_companies_in_the_21st_century.pdf
[11] "Energy use and CO2 -emissions for consumed products and Services", www.scb.se/statistik/_publikationer/MI1301_2005A01_BR_MIFT0602.pdf
[12] Two examples: 2000:2 Svenska produkter som minskar koldioxidutsläpp Anna-Karin Hjalmarsson, ÅF http://miljoteknik.vinnova.se/rapporter/r2000_2.pdf and IT and sustainable development - a central issue for the future Dennis Pamlin and Ewa Thorslund assets.panda.org/downloads/itsustainabledev.pdf
[13] http://worldbank.org/html/prddr/trans/octnovdec02/pgs4-6.htm
[14] http://www.economist.com/surveys/displayStory.cfm?story_id=3689214
[15] http://www.businessweek.com/magazine/toc/05_34/B3948chinaindia.htm
[16] See for example: The Economist, Now for the Hard Part – A survey of Business in India, June 3rd 2006, page 4
[17] This shift from west to the east have upset some actors and there are tendency where the old economic superpowers are trying to create tensions between the to emerging super powers. See for example: http://www.cfr.org/publication/9962/ , http://www.cnn.com/2006/WORLD/asiapcf/03/02/bush.india.visit/index.html , http://www.blonnet.com/2005/07/01/stories/2005070100310900.htm
[18] It is predicted that by 2007 urban population will exceed the rural http://www.un.org/esa/population/publications/wup2003/pop899_English.pdf
[19] http://esa.un.org/unup/
[20] http://www.un.org/esa/population/publications/WPP2004/WPP2004_Volume3.htm
[21] http://www.iea.org/Textbase/nppdf/free/2006/Key2006.pdf
[22] Manning, Robert A., "The Asian Energy Market: A New Geopolitics?", *Asian Energy Markets dynamics and trends*, Abu Dhabi: Emirates Center for Strategic studies and Research, 2004, p.31
[23] South Korean President Roh Moo-hyun said "I find this trend [expanding economic cooperation] highly desirable and hope that the cooperation in energy and natural resources will go beyond merely increasing trade volume and develop further into technology sharing and joint development of natural resources." during his UAE visit in May quoted in: http://www.gulfnews.com/nation/Government/10039644.html. Former Saudi Oil Minister and senior OPEC official Ahmed Zaki Yamani was quoted saying "For the first time we are focusing on Asia" in a keynote address to an annual London energy conference in 1998 by Manning, Robert A., "The Asian Energy Market: A New Geopolitics?", Asian Energy Markets dynamics and trends, Abu Dhabi: Emirates Center for Strategic studies and Research, 2004, p.41.
[24] http://www.atimes.com/atimes/China_Business/HF03Cb05.html
[25] http://www.chinadaily.com.cn/china/2006-03/21/content_547967.htm
[26] Urbanisation in India, Pranati Datta, Population Studies Unit, June, 2006
[27] Kumari Selja, Minister for Housing and Urban Poverty Alleviation at the inauguration of ministerial segment of the first Asia Pacific Ministerial Conference in New Delhi on 15th December 2006

[28] ICT can for example make work more efficient both on a daily basis if people at relevant positions are allowed to work from home one to three days a week. Video and audio conferences can make it easier to build networks both within India and with other important emerging markets such as China, Russia, Brazil and South Africa as well existing economies like EU and US.