



## Green ICT – Pink elephants or real returns?

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## ICT - a clean industry!?



- The carbon footprint of one Google search .....
- ..... is similar to that of an 11W energy savings light bulb operating one hour.
- With 150-200 m searches per day Google demands about 3,000 photovoltaic power plants.

# Coming under fire



- For a long time, the ICT sector had built up a clean, non-polluting image.
- Now, though, it is becoming clear that its carbon footprint is significant: The sector is causing round about 2% of global CO<sub>2</sub> emissions - as much as air transport.

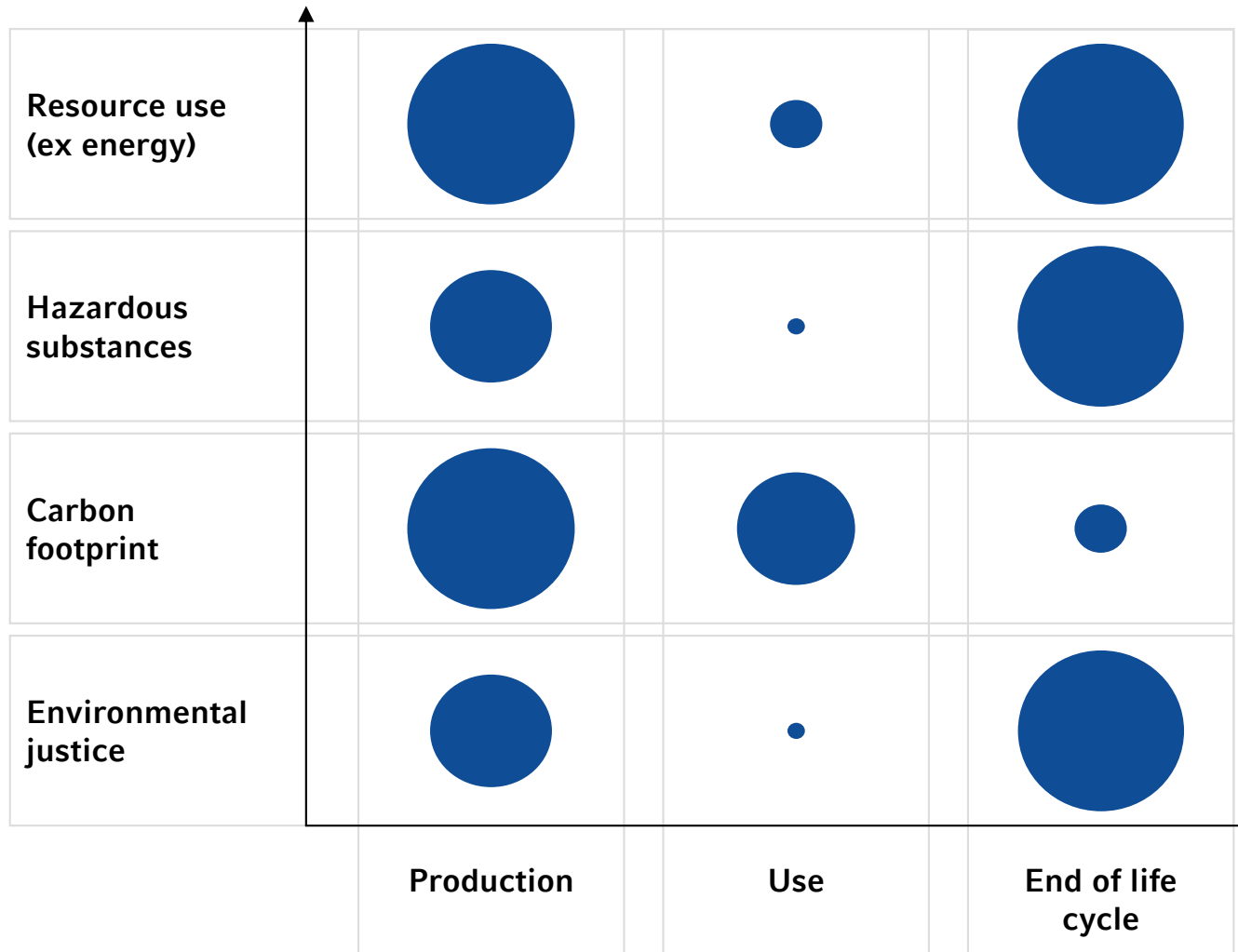
## CO<sub>2</sub> emissions by the ICT industry

Segment	Main units (2006)	Primary energy	CO <sub>2</sub> emissions
Mobile Telecom	2.6 bn subs	0.12%	0.14%
Fixed Telecom	1.3 bn fixed lines, 200m broadband lines	0.26%	0.30%
ICT, commercial use	34m servers, 400m PCs	0.75%	0.80%
ICT, household use	600m PCs	0.55%	0.60%
<b>Total</b>		<b>1.70%</b>	<b>1.90%</b>

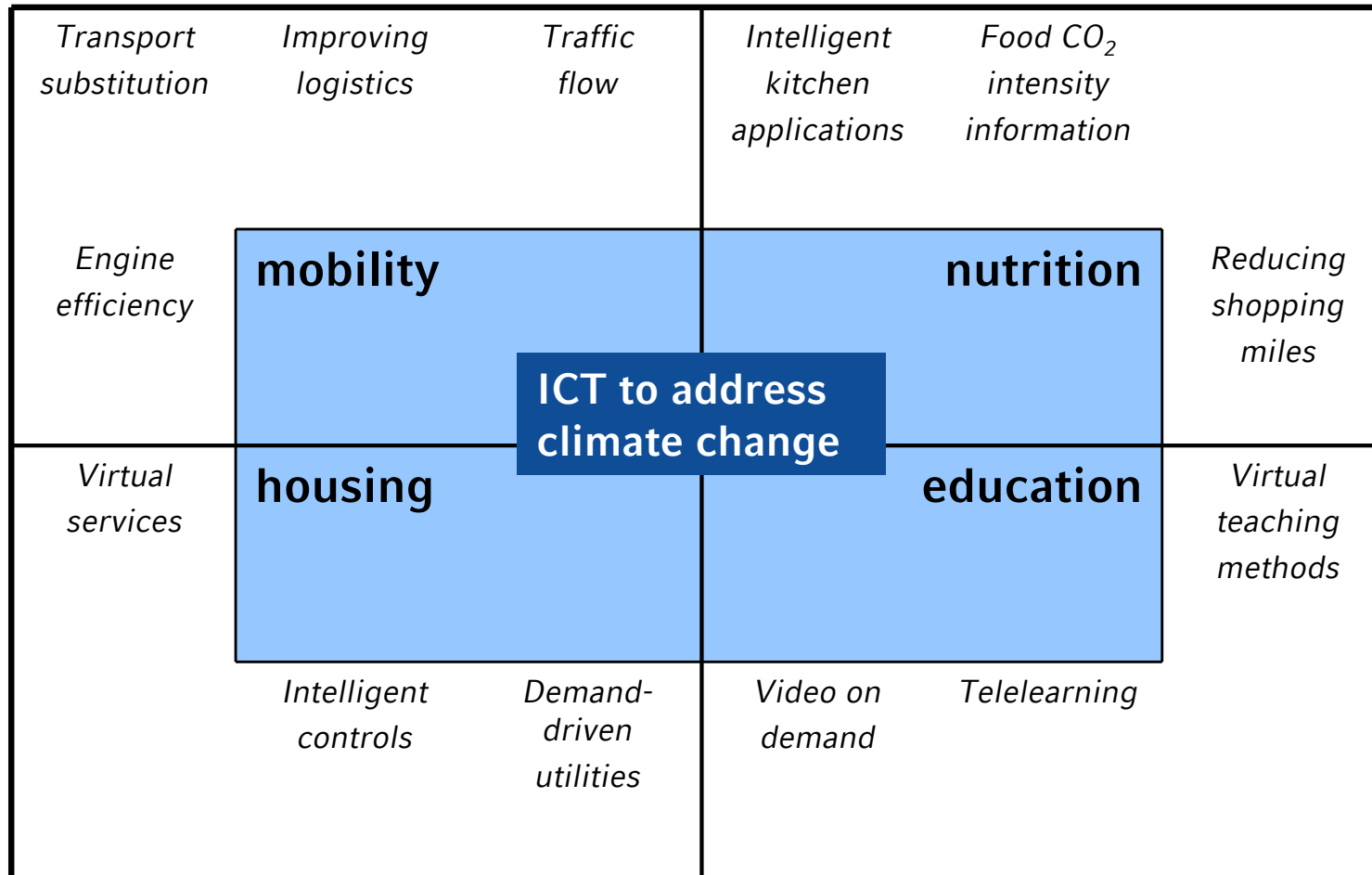
Source Ericsson

# 'It's not just the carbon, stupid'

Life-cycle assessment of ICT equipment and the materiality of the four main areas of impact



# ICT & the environment: part of the problem, but also part of the solution



Source GeSI 2007

## Corporate disclosure of environmental information

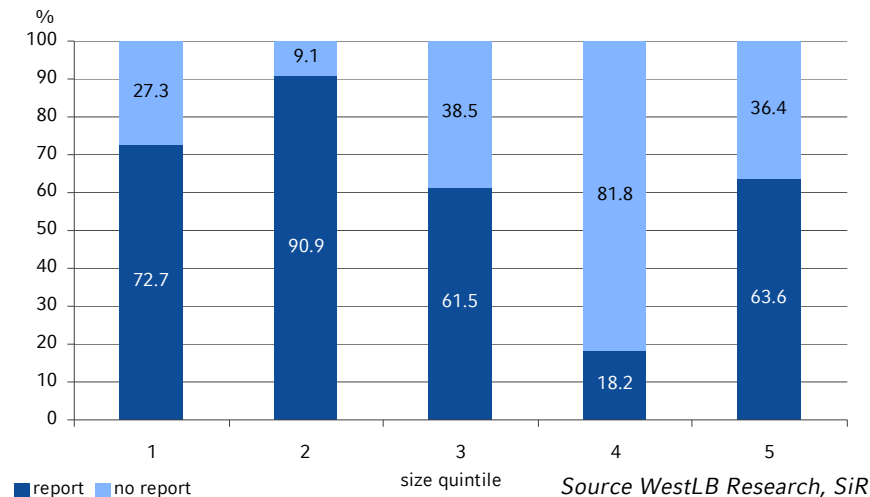
# 'Green ICT' – a look at companies' ESG reports

- 34 of the 57 ICT companies within our sample (DJ STOXX 1800) have provided ESG reports over the past two years.
- While there is a size-effect present in the overall market, for the 57 ICT companies we observed no pervasive size-effect.
- Similar to the overall market, the reporting propensity for ICT companies in North America is much lower (46%) than in Europe (59%). For Japan, however, it's extraordinary high (92%).
- 'Office Electronics' displays highest reporting rate (83.3%) followed by 'Computer Hardware' (77.8%).
- The 'average company' reports on 64.7% (11 out of the required 17) 'core indicators'.
- Energy consumption, GHG and initiatives to mitigate environmental impacts covered by all nine companies.

## Extra-financial reporting by sub-sectors

GICS sector	Number of companies	reporting			GRI adherence	
		no	yes	%	number	%
<b>Technology Hardware &amp; Equipment</b>	<b>32</b>	<b>10</b>	<b>22</b>	<b>68.8</b>	<b>9</b>	<b>40.9</b>
Communications Equipment	11	4	7	63.6	4	57.1
Computer Hardware	9	2	7	77.8	4	57.1
Computer Storage & Peripherals	6	3	3	50.0	0	0
Office Electronics	6	1	5	83.3	1	20.0
<b>Semiconductors &amp; Semicond. Equip.</b>	<b>25</b>	<b>13</b>	<b>12</b>	<b>48.0</b>	<b>4</b>	<b>33.3</b>
Semiconductor Equipment	7	2	5	71.4	1	20.0
Semiconductors	18	11	7	38.9	3	42.9
<b>Total</b>	<b>57</b>	<b>23</b>	<b>34</b>	<b>59.6</b>	<b>13</b>	<b>38.2</b>

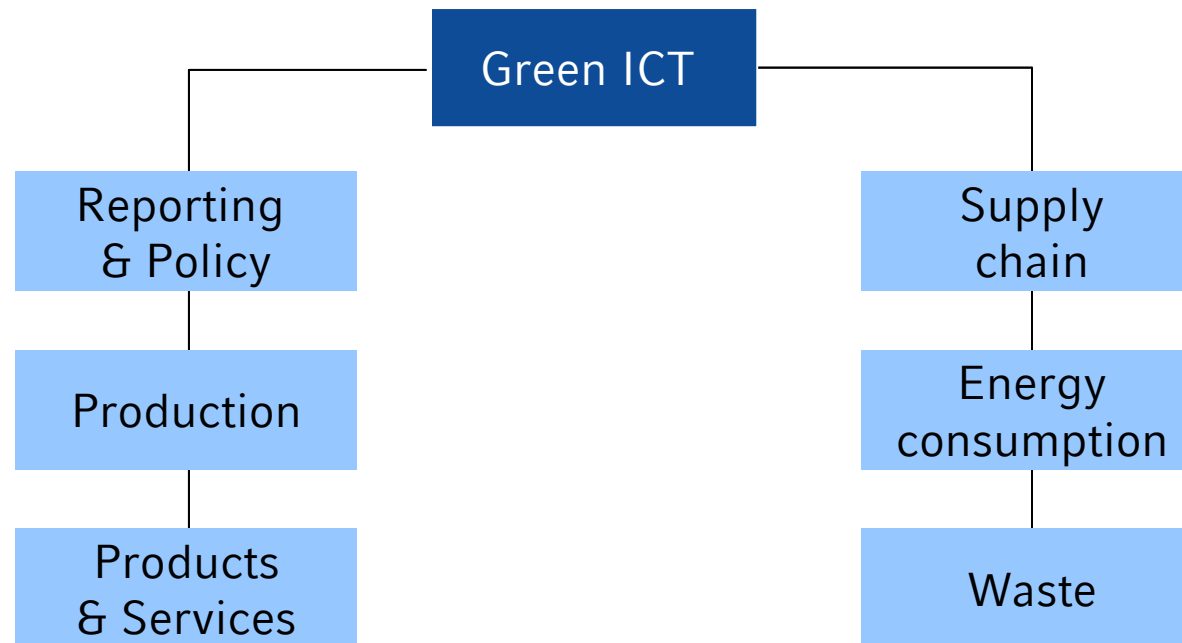
## Size effect within the ICT sector



## The integration of financial decision making variables

# Introducing the WestLB 'Green ICT indicator'

- 'Green ICT' ratings for 57 companies from all over the world, representing six industry groups, based on our extra-financial rating system.
- Additional sub-indicators 'reporting & policy', 'production' and 'products', and four theme indicators 'suppliers', 'energy', 'products' and 'waste'.



Source WestLB Research, SiRi

## The integration of financial decision making variables

# Green ICT rating (total) – best and worst in class

GICS sector level 4	Company	Rank		Market Cap USD m*	Country
		sector	overall		
Communications Equipment	Ericsson	1	9	40,042.7	Sweden
	Juniper Networks	10	54	14,693.5	USA
	Research in Motion Ltd.	10	54	67,244.0	Canada
Computer Hardware	NEC Corporation	1	1	10,655.1	Japan
	Wincor Nixdorf AG	9	34	2,516.3	Germany
Computer Storage & Peripherals	Seiko Epson Corp.	1	3	3,995.9	Japan
	SanDisk Corp.	6	43	7,423.0	USA
Office Electronics	Canon	1	7	63,925.5	Japan
	Neopost SA	6	38	3,631.8	France
Semiconductor Equipment	ASML Holding	1	4	13,304.8	Netherlands
	KLA Tencor Corp	7	56	8,330.9	USA
Semiconductors	STMicroelectronics	1	12	8,519.4	Switzerland
	Marvell Technology Group	18	57	6,902.0	USA

\* as of 15/05/08

Source WestLB Research, SiRI



## Carbon footprint

- Data centre energy usage could be reduced by around 20%, even with existing IT equipment.
- Use of fuel cells and other distributed generation technologies as well as the virtualization of servers are just two of several data centre optimization technologies that could help reduce energy costs by 50%.
- With regard to PCs and office equipment, desktop virtualization and ‘thin clients’, ‘Power over ethernet’ and behavioural changes are key.
- Strong momentum in carbon accounting and product labelling expected.

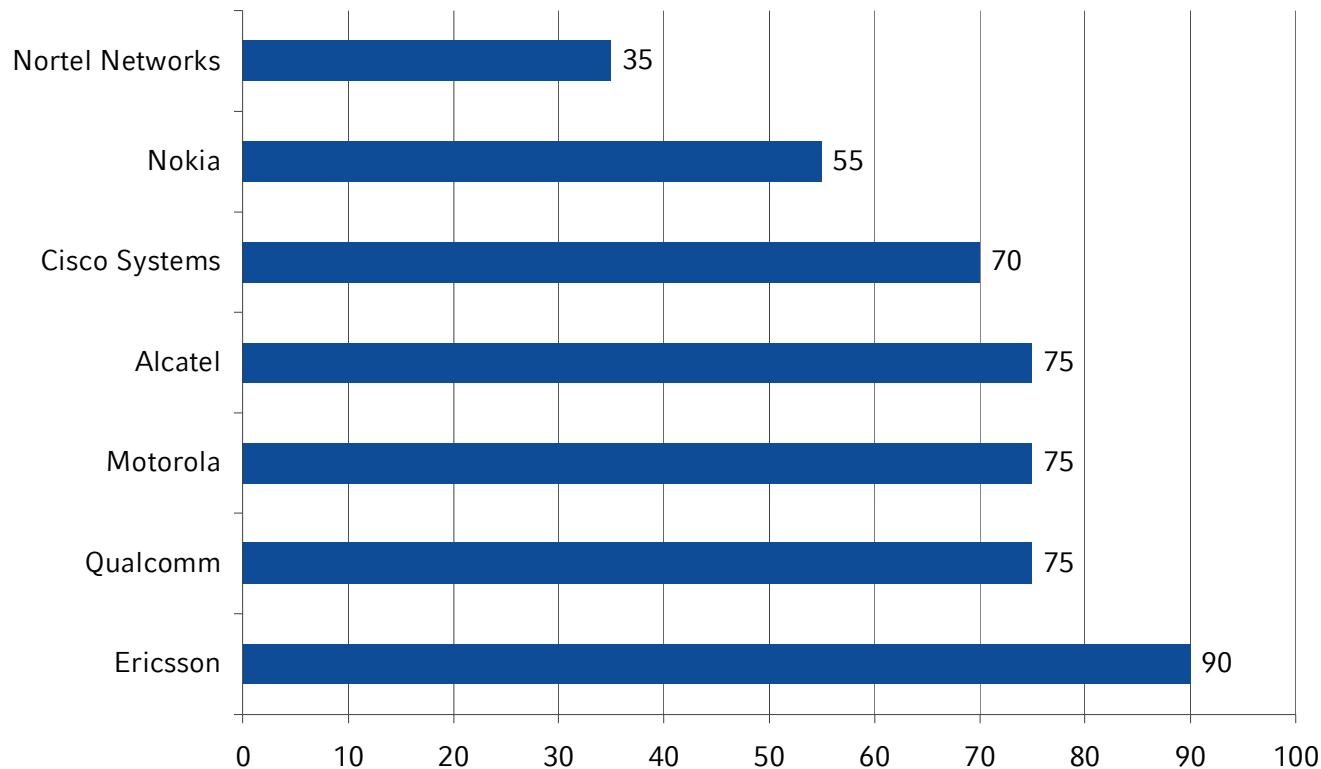
### ‘Green ICT’ sub-indicator ‘Energy consumption’ – best and worst scores in class

GICS sector level 4	number of companies	energy score			company with ... highest scores	lowest scores
		avg	max	min		
Communications Equipment	11	-0.10	1.56	-1.13	Ericsson	Research in Motion Ltd.
Computer Hardware	9	1.01	2.77	-0.42	TOSHIBA CORP	Wincor Nixdorf AG
Computer Storage & Peripherals	6	-0.21	1.74	-1.13	Seiko Epson Corp.	SanDisk
Office Electronics	6	0.33	1.20	-0.78	Ricoh Co Ltd	Neopost SA
Semiconductor Equipment	7	0.17	1.92	-1.13	Tokyo Electron	KLA Tencor Corp, Lam Research
Semiconductors	18	-0.35	1.47	-1.13	STMicroelectronics	Broadcom and others

Source WestLB Research, SiRi

# Closing the circle – the carbon footprint of the ICT industry and the Carbon Disclosure Project (CDP)

## Climate Disclosure Leadership Index (CDLI) – Scores (CDP5, 2007) (Communications Equipment)



Source WestLB Research, CDP

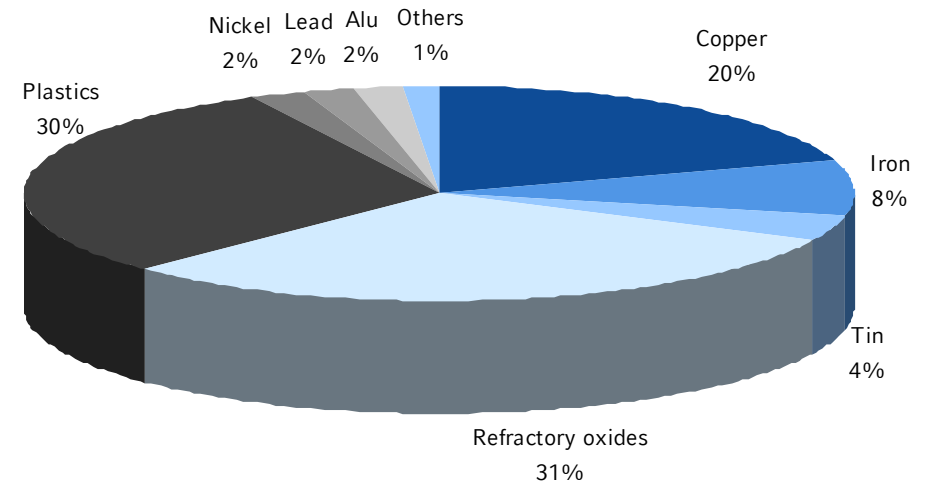
- 3 additional industry groups: Computers & Peripherals, Semiconductor Equipment & Products, Software & IT Services
- No response: Apple, Foxconn, RIM, Softbank, Tata Consultancy Services
- Declined to participate: Infineon, Accenture, Electronic Arts, The Western Union Company

## Life cycle assessment – Material ‘green’ challenges for the ICT sector

### E-Waste

- 70% of heavy metals found in landfill, including mercury and cadmium, come from electronic equipment discards.
- Most e-waste is exported to developing countries, hidden under the umbrella of charity (‘computers for the poor’). Some 70% of global e-waste is dumped in China, with most of the rest going to India and to African nations.

#### Composition of e-waste



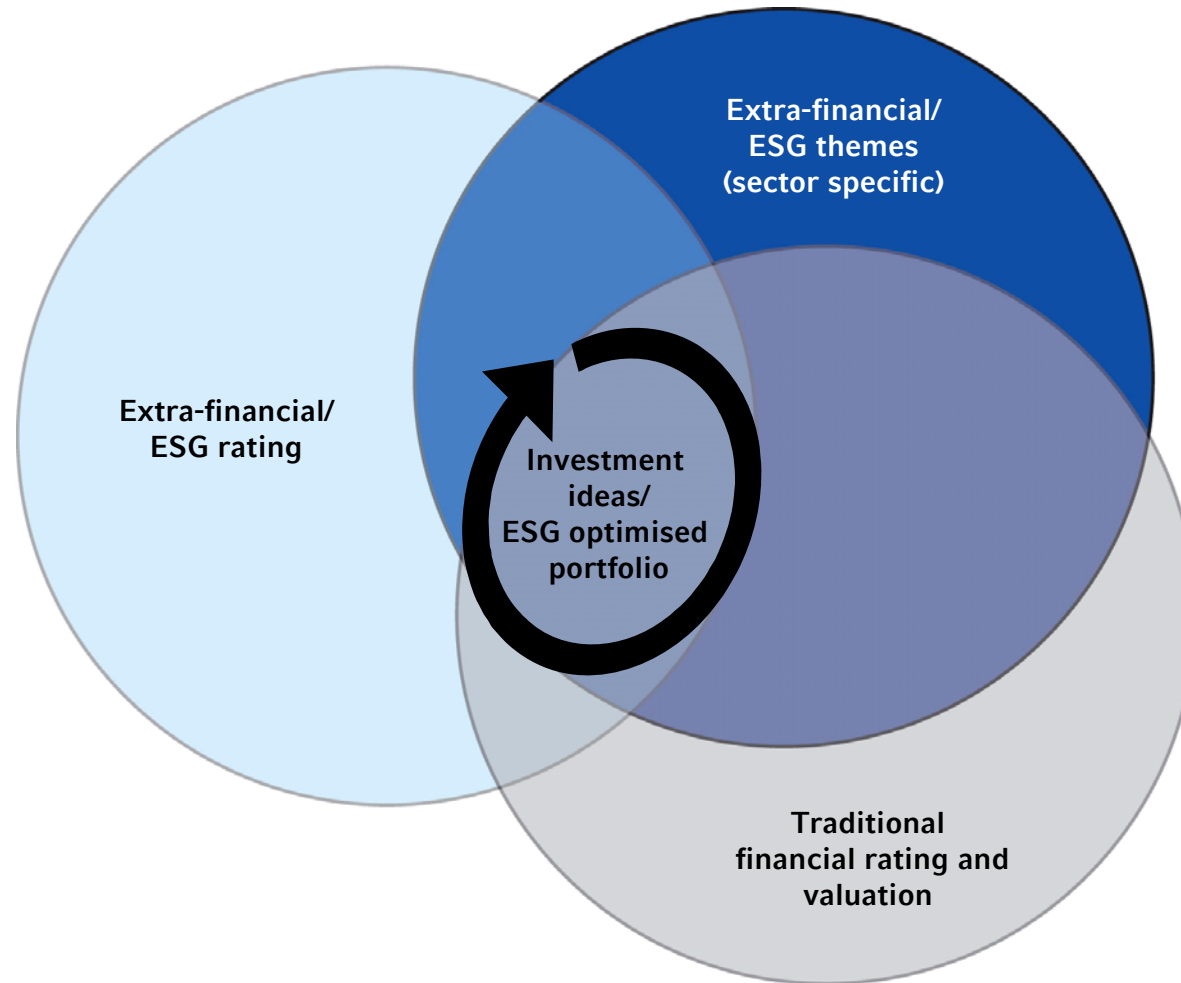
Source Basel Action Network

#### ‘Green ICT’ sub-indicator ‘Waste’ – best and worst scores in class

GICS sector level 4	number of companies	waste score			company with ... highest scores	lowest scores
		avg	max	min		
Communications Equipment	11	0.15	0.95	-0.50	Nokia	Juniper Networks, Nortel, RIM
Computer Hardware	9	0.97	1.57	0.32	NEC Corporation	Wincor Nixdorf AG
Computer Storage & Peripherals	6	0.39	1.57	-0.50	Seiko Epson Corp.	SanDisk
Office Electronics	6	0.74	1.36	-0.09	Konica Minolta, Ricoh Co Ltd	Neopost SA
Semiconductor Equipment	7	-0.77	0.53	-1.54	ASML Holding	KLA Tencor Corp, Lam Research
Semiconductors	18	-1.00	-0.19	-1.54	STMicroelectronics	Arm Holdings , Broadcom , Marvell Technology, Microchip Technology, NVIDIA Corp.

Source WestLB Research

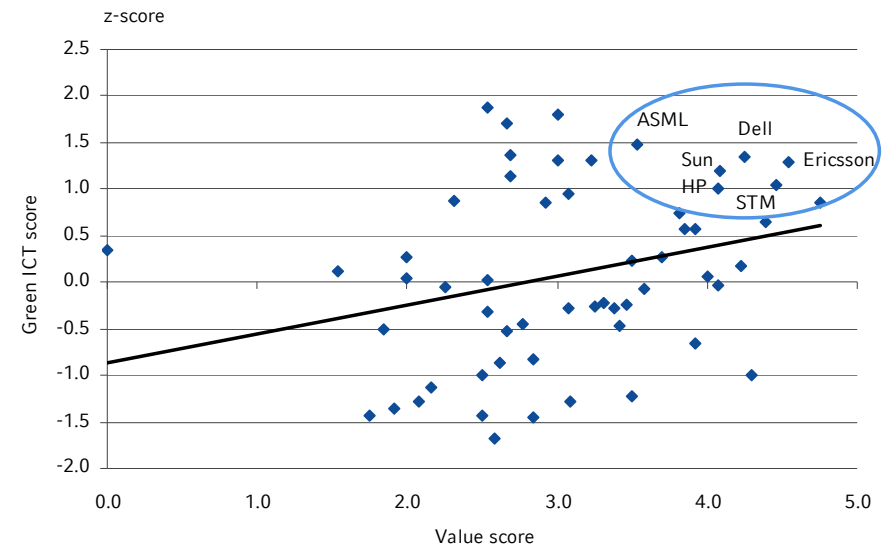
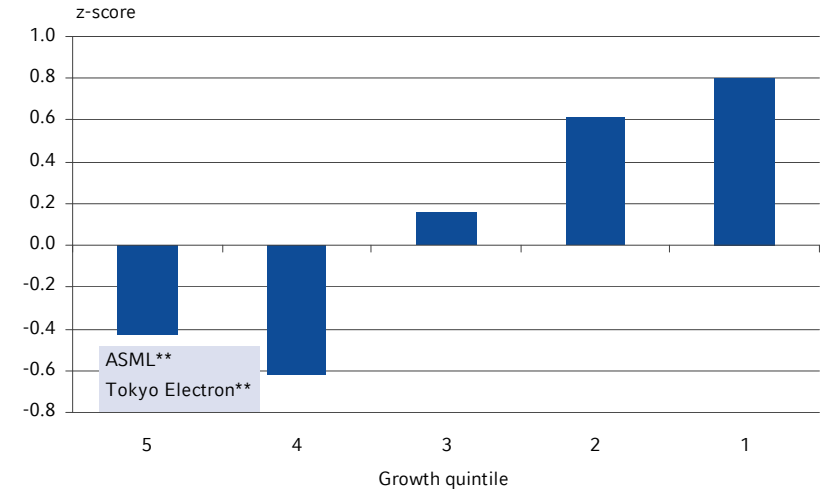
# The integration of financial decision making variables



## The integration of financial decision making variables

# Green ICT stock ideas for growth/value investors

- Integration of the 'Green ICT' ratings of companies with traditional financial selection criteria based on growth and value measures.
- The aim is to provide investment ideas from the perspectives of three types of investor (investment styles): 'Growth', 'Value' and 'G.A.R.P.' (Growth At a Reasonable Price).
- Significant correlation between financial characteristics and 'Green ICT' scores:
  - higher 'Value' scores imply higher 'Green ICT' scores
  - higher 'Growth' scores imply lower 'Green ICT' scores



Source WestLB Research, SiRi, JCF

## The integration of financial decision making variables

# Green ICT stock ideas for growth/value investors

Company	Growth score	Value score	Green ICT z score	Market Cap in US\$*	Price 15/05/08
<b>Long ideas - Growth</b>					
ASML Holding	4.00	3.54	1.47	13,304.8	29.93
Tokyo Electron	3.88	2.31	0.88	10,742.9	65.08
<b>Short ideas - Growth</b>					
Micron Technology Inc	4.15	4.30	-1.01	6,668.7	8.84
ARM Holdings	3.44	2.15	-1.13	2,795.8	2.08
Nvidia Corporation	3.43	3.50	-1.23	13,211.5	23.78
Broadcom	3.50	1.92	-1.36	12,910.2	27.58
Research in Motion Ltd.	4.71	1.75	-1.43	67,244.0	140.88
Juniper Networks	4.07	2.50	-1.43	14,693.5	28.17
Marvell Technology Group	3.69	2.58	-1.68	6,902.0	14.83
<b>Long ideas - Value</b>					
ASML Holding	4.00	3.54	1.47	13,304.8	29.93
Dell Inc	2.69	4.25	1.34	40,644.8	20.63
Ericsson	1.87	4.54	1.29	40,042.7	2.70
Sun Microsystems Inc	2.91	4.08	1.19	10,694.4	13.49
STMicroelectronics	2.44	4.46	1.05	8,519.4	12.92
Hewlett Packard Co	2.41	4.08	1.00	120,472.6	46.73
<b>Short ideas - Value</b>					
Micron Technology Inc	4.15	4.30	-1.01	6,668.7	8.84
Nvidia Corporation	3.43	3.50	-1.23	13,211.5	23.78
<b>Long ideas - G.A.R.P.</b>					
ASML Holding	4.00	3.54	1.47	13,304.8	29.93
<b>Short ideas - G.A.R.P.</b>					
KLA Tencor Corp	2.41	2.85	-1.45	8,330.9	46.27

\* as of 15/05/08

Source WestLB Research, SiRi

# Obstacles – why the industry is not yet ‘green’ enough

- The industry is highly competitive, and this has led to strategies on cost leadership, resulting in complex global production networks and supply chains with high shares of outsourced contract manufacturing.
- In such a system, it is not only difficult to monitor and verify environmental compliance, the system’s intrinsic cost pressures are themselves in conflict with environmental goals.
- Buy side ICT professionals cite time pressure, costs and lack of corporate commitment as biggest obstacles to implementing new ‘Green ICT’ technologies.
- Other significant barriers are the scarcity of information and a lack of knowledge within the organisation.
- ICT professionals, thus, call for recognised industry standards, an improvement in the impartiality and robustness of environmental information provided by ICT vendors, and tax incentives for organisations that adopt ‘Green ICT’ practices as most helpful support to implement environmental improvements.

# Catalysts for change

## **Structural drivers that will make the industry change course**

- Increasing energy- and carbon costs.
- The impact of climate change and other environmental issues on brand values and customer behaviour.
- Governments and regulatory pressure & voluntary initiatives:
  - EU directives RoHS, WEEE, REACH, EuP
  - Ecolabelling initiatives: EPEAT, ENERGY STAR
  - Other initiatives: CSCI, GeSI, Green Grid, ...



## Wrapping up

- Is 'Green ICT' just a pink elephant, an illusion that will vanish as quickly as it appeared on the industry's radar screen, or is it indeed about tapping new profit potential and reducing financial risks? We believe that the latter is true, but we also feel that quick wins are not in sight – nor are there any low-hanging fruit.
- Most ICT organisations are still at the very early stages of 'going green'.
- 'Green procurement' and changes in the regulatory environment will certainly put a lot of pressure on vendors of ICT equipment and infrastructure to prove their green credentials.
- For industry leaders it will certainly not suffice just to have a green marketing message in place. Companies who still believe that will lose competitiveness and market share.

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Hold	94	35	Hold	21	31
Sell/Reduce	29	11	Sell/Reduce	4	6

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