Appendix 1 – New data inventory sheets

In Appendix 1 all new data inventoried for the study are presented in the format provided in SimaPro. Text in formulas in the column where amounts of resources used or emissions are noted (e.g. "Desktop" and "(1-Desktop)" or "CO2cap_el" and "(1-CO2cap_el)" is related to the different sensitivity analyses and the parameters that can be varied. Thus when Desktop computer is assumed "Desktop" will be 1 and "(1-Desktop)" will be zero and not accounted for. The data sheets as presented in this appendix shows the formulas but not the resulting figures, as this is how the data sheets are exported from the software.

In some cases we needed to assemble different processes in a separate step, due to modelling reasons. These data sheets are described as "Process box for assembling the incoming processes." In this Appendix.

Data sheets from Ecoinvent that have only been adjusted are not shown in this appendix. The processes in Ecoinvent 2.0 (as provided in SimaPro 7.1.8) that were adjusted to include the electricity mixes suggested in this study were the following:

Chips, Scandinavian softwood (plant-debarked), u = 70%, at plant/m3/NORDEL
Kaolin, at plant/kg/RER U
Industrial residue wood, softwood, forest-debarked, u=70%, at plant/RER U
Paper, woodfree, uncoated, at integrated mill/RER U
Paper, newsprint, 0% DIP, at plant/RER U
Sulphate pulp, average, at regional storage/kg/RER U
Recycling paper/RER
Use, printer, laser jet, b/w, per kg printed paper/CH U

Electricity mixes

SimaPro 7.1	Process	Date:	2008-11-14	Time:	15:33:33
Project	Invoices Itella				

Process

Category type	Energy
Process identifier	Institut14008900021
Type	Unit process
Process name	**Electricity mix "CO2-cap" at grid**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	
Generator	Finnveden (2008) suggests to use two different electricity mixes and suggests two compositions based on Mattsson N. et al. 2003.
Literature references	Mattson et al. 2003 Finnveden 2008
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Electricity mix "CO2-cap" at grid	*91,2*	kWh	100	not defined	Others\ Electricity mix	8,8% distribution losses (Ecoinvent Energy report)
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity, at wind power plant/RER S	*21,79*	kWh	Undefined			
Electricity, nuclear, at power plant/UCTE S	*23,09*	kWh	Undefined			
Electricity, at cogen 6400kWth, wood, allocation energy/CH S	*35,72*	kWh	Undefined			
Electricity, hard coal, at power plant/NORDEL S	*0,77*	kWh	Undefined			
Electricity, oil, at power plant/SE S	*-1,41*	kWh	Undefined			
Electricity, at cogen 500kWe lean burn, allocation energy/CH S	*19,95*	kWh	Undefined			
Electricity, hydropower, at power plant/SE S	*0,1*	kWh	Undefined			
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-14	Time: 15:44:02
Project	Invoices Itella			

Process

Category type	Energy
Process identifier	Institut14008900020
Type	Unit process
Process name	**Electricity mix "high gas price" at grid**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	Finnveden (2008) suggests to use two different electricity mixes and suggests two compositions based on Mattsson N. et al. 2003.
Generator	
Literature references	Mattson et al. 2003 Finnveden 2008
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Electricity mix "high gas price" at grid	*91,2*	kWh	100	not defined	Others\ Electricity mix	8,8% distribution losses (Ecoinvent Energy report)
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity, at wind power plant/RER S	*11,32*	kWh	Undefined			
Electricity, nuclear, at power plant/UCTE S	*0*	kWh	Undefined			
Electricity, at cogen 6400kWth, wood, allocation energy/CH S	*0,53*	kWh	Undefined			
Electricity, hard coal, at power plant/NORDEL S	*59,99*	kWh	Undefined			
Electricity, oil, at power plant/SE S	*3,03*	kWh	Undefined			
Electricity, at cogen 500kWe lean burn, allocation energy/CH S	*25,33*	kWh	Undefined			
Electricity, hydropower, at power plant/SE S	*-0,21*	kWh	Undefined			
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

Electronic invoice system

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:02:51
Project	Invoices Itella				

Process

Category type	Use
Process identifier	Institut14008900085
Type	Unit process
Process name	**Archive electronic invoice (New)**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-11
Record	Clara Borggren
Generator	
Literature references	
Collection method	
Data treatment	
Verification	
Comment	Process box for assembling the incoming processes. All input related to one electronic invoice.
Allocation rules	
System description	

Products						
Archive electronic invoice (New)	*1*	p	100	not defined	Administration	1p = 1 invoice = 3,5 kB
Avoided products						
Resources						
Materials/fuels						
Server prod, transport and waste man. for e-archive	*1*	p	Undefined			
Electricity/heat						
Electricity mix for Archive electronic invoice	*1*	p	Undefined			
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:04:33
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900083
Type	Unit process
Process name	**Computer (prod, transport and waste man.) for office e-handling**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	IVF (2007) p 101 and 104
Collection method	Calculations on share of total computer use based on figures from IVF (2007)
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Computer (prod, transport and waste man.) for office e-handling	*1*	p	100	not defined	Electronics \Devices	Corresponds to handling of one B-to-B electronic invoice
Avoided products						
Resources						
Materials/fuels						
Desktop computer, without screen, at plant/GLO S	*7,31315E-05 *5/60*Desktop*	p		Undefined		
Keyboard, standard version, at plant/GLO S	*7,31315E-05 *5/60*Desktop*	p		Undefined		
Mouse device, optical, with cable, at plant/GLO S	*7,31315E-05 *5/60*Desktop*	p		Undefined		
LCD flat screen, 17 inches, at plant/GLO S	*6,44496E-05 *5/60*Desktop*	p		Undefined		
Laptop computer, at plant/GLO S	*7,65404E-05*5/60 *(1-Desktop)*	p		Undefined		
Transport, transoceanic freight ship/OCE S	*Desktop*7,31315E-05*5/60* (0,0113+0,00118+0,000120) *15000*	tkm		Undefined		Boat transport for desktop+keyboard+mouse+screen
Transport, transoceanic freight ship/OCE S	*Desktop*6,44496E-05 *5/60*0,005075*15000*	tkm		Undefined		
Transport, transoceanic freight ship/OCE S	*(1-Desktop)*0,000144092 *5/60*0,00315*15000*	tkm		Undefined		Boat transport for Laptop
Transport, lorry 16-32t, EURO3/RER S	*Desktop*7,31315E-05*5/60* (0,0113+0,00118+0,000120)*500*	tkm		Undefined		Lorry transport for desktop+keyboard+mouse+screen
Transport, lorry 16-32t, EURO3/RER S	*Desktop*6,44496E-05 *5/60*0,005075*500*	tkm		Undefined		
Transport, lorry 16-32t, EURO3/RER S	*(1-Desktop)*7,65404E-05 *5/60*0,00315*500*	tkm		Undefined		Lorry transport for Laptop
Electricity/heat						
Emissions to air						

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Disposal, desktop computer, to WEEE treatment/CH U	*7,31315E-05 *5/60*Desktop*	p	Undefined	
Disposal, keyboard, standard version, to WEEE treatment/CH U	*7,31315E-05 *5/60*Desktop*	p	Undefined	
Disposal, mouse device, optical, with cable, to WEEE treatment/CH U	*7,31315E-05 *5/60*Desktop*	p	Undefined	
Disposal, LCD flat screen, 17 inches, to WEEE treatment/CH U	*6,44496E-05 *5/60*Desktop*	p	Undefined	
Disposal, laptop computer, to WEEE treatment/CH U	*0,000144092 *5/60*(1-Desktop)*	p	Undefined	

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	09:59:38
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900106
Type	Unit process
Process name	**Computer (prod, transport and waste man.) for printing (1A4)**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	Larsen et al 2006 page. 101, 104. Calculations based on use time of the computer.
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Computer (prod, transport and waste man.) for printing (1A4)	*1*	p	100	not defined	Electronics\Devices	
Avoided products **Resources** **Materials/fuels**						
Desktop computer, without screen, at plant/GLO U	*0,7*0,000105352*0,001282051* Desktop*		p	Undefined	Use of desktop for printing of 1 invoice at home	
Keyboard, standard version, at plant/GLO U	*0,7*0,000105352*0,001282051* Desktop*		p	Undefined	Use of keyboard for printing of 1 invoice at home	
Mouse device, optical, with cable, at plant/GLO U	*0,7*0,000105352*0,001282051* Desktop*		p	Undefined	Use of muose for printing of 1 invoice at home	
LCD flat screen, 17 inches, at plant/GLO U	*0,7*0,000129299*0,001282051* Desktop*		p	Undefined	Use of screen for printing of 1 invoice at home	
Laptop computer, at plant/GLO U	*0,7*0,000144092*0,001282051* (1-Desktop)*		p	Undefined	Use of Laptop for printing of 1 invoice at home	
Transport, transoceanic freight ship/OCE S	*0,7*Desktop*0,000105352* 0,001282051*(0,0113+0,00118+ 0,000120)*15000*		tkm	Undefined	Boat transport for desktop+keyboard+mouse+screen	
Transport, transoceanic freight ship/OCE S	*0,7*Desktop*0,000129299* 0,001282051*0,005075*15000*		tkm	Undefined		
Transport, transoceanic freight ship/OCE S	*0,7*(1-Desktop)*0,000144092 *0,001282051*0,00315*15000*		tkm	Undefined	Boat transport for Laptop	
Transport, lorry 16-32t, EURO3/RER S	*0,7*Desktop*0,000105352* 0,001282051*(0,0113+0,00118+ 0,000120)*500*		tkm	Undefined	Lorry transport for desktop+keyboard+mouse+screen	
Transport, lorry 16-32t, EURO3/RER S	*0,7*Desktop*0,000129299* 0,001282051*0,005075*500*		tkm	Undefined		
Transport, lorry 16-32t, EURO3/RER S	*0,7*(1-Desktop)*0,000144092 *0,001282051*0,00315*500*		tkm	Undefined	Lorry transport for Laptop	
Desktop computer, without screen, at plant/GLO U	*0,3*7,31315E-05 *0,001282051*Desktop*		p	Undefined	Use of desktop for printing of 1 invoice at office	

Keyboard, standard version, at plant/GLO U	*0,3*7,31315E-05 *0,001282051*Desktop*	p	Undefined	Use of keyboard for printing of 1 invoice at office
Mouse device, optical, with cable, at plant/GLO U	*0,3*7,31315E-05 *0,001282051*Desktop*	p	Undefined	Use of muose for printing of 1 invoice at office
LCD flat screen, 17 inches, at plant/GLO U	*0,3*6,44496E-05 *0,001282051*Desktop*	p	Undefined	Use of screen for printing of 1 invoice at office
Laptop computer, at plant/GLO U	*0,3*7,65404E-05*0,001282051* (1-Desktop)*	p	Undefined	Use of Laptop for printing of 1 invoice at office
Transport, transoceanic freight ship/OCE S	*0,3*Desktop*7,31315E-05 *0,001282051*(0,0113+ 0,00118+0,000120)*15000*	tkm	Undefined	Boat transport for desktop+keyboard+mouse+screen
Transport, transoceanic freight ship/OCE S	*0,3*Desktop*6,44496E-05 *0,001282051*0,005075* 15000*	tkm	Undefined	
Transport, transoceanic freight ship/OCE S	*0,3*(1-Desktop)*7,65404E-05 *0,001282051*0,00315*15000*	tkm	Undefined	Boat transport for Laptop
Transport, lorry 16-32t, EURO3/RER S	*0,3*Desktop*7,31315E-05 *0,001282051*(0,0113+0,00118+ 0,000120)*500*	tkm	Undefined	Lorry transport for desktop+keyboard+mouse+screen
Transport, lorry 16-32t, EURO3/RER S	*0,3*Desktop*6,44496E-05 *0,001282051*0,005075*500*	tkm	Undefined	
Transport, lorry 16-32t, EURO3/RER S	*0,3*(1-Desktop)*7,65404E-05 *0,001282051*0,00315*500*	tkm	Undefined	Lorry transport for Laptop

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Disposal, desktop computer, to WEEE treatment/CH U	*0,7*0,000105352*0,002564103* Desktop*	p	Undefined	
Disposal, keyboard, standard version, to WEEE treatment/CH U	*0,7*0,000105352*0,002564103* Desktop*	p	Undefined	
Disposal, mouse device, optical, with cable, to WEEE treatment/CH U	*0,7*0,000105352*0,002564103* Desktop*	p	Undefined	
Disposal, LCD flat screen, 17 inches, to WEEE treatment/CH U	*0,7*0,000129299*0,002564103* Desktop*	p	Undefined	
Disposal, laptop computer, to WEEE treatment/CH U	*0,7*0,000144092*0,002564103* (1-Desktop)*	p	Undefined	
Disposal, desktop computer, to WEEE treatment/CH U	*0,3*7,31315E-05 *0,002564103*Desktop*	p	Undefined	
Disposal, keyboard, standard version, to WEEE treatment/CH U	*0,3*7,31315E-05 *0,002564103*Desktop*	p	Undefined	
Disposal, mouse device, optical, with cable, to WEEE treatment/CH U	*0,3*7,31315E-05 *0,002564103*Desktop*	p	Undefined	
Disposal, LCD flat screen, 17 inches, to WEEE treatment/CH U	*0,3*6,44496E-05 *0,002564103*Desktop*	p	Undefined	
Disposal, laptop computer, to WEEE treatment/CH U	*0,3*7,65404E-05*0,002564103* (1-Desktop)*	p	Undefined	

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:09:26
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900095
Type	Unit process
Process name	**Computer (prod, transport and waste man.) for printing**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	IVF (2007) page 101, 104. Calculations based on time cumputor is in use at office or at home. Sleep and offmode are allocated to active mode
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products								
Computer (prod, transport and waste man.) for printing	*1*	p	100	not defined	Electronics\Devices			
Avoided products **Resources** **Materials/fuels**								
Desktop computer, without screen, at plant/GLO U	*0,7*0,000105352*0,002564103* Desktop*	p		Undefined	Use of desktop for printing of 1 invoice at home			
Keyboard, standard version, at plant/GLO U	*0,7*0,000105352*0,002564103* Desktop*	p		Undefined	Use of keyboard for printing of 1 invoice at home			
Mouse device, optical, with cable, at plant/GLO U	*0,7*0,000105352*0,002564103* Desktop*	p		Undefined	Use of muose for printing of 1 invoice at home			
LCD flat screen, 17 inches, at plant/GLO U	*0,7*0,000129299*0,002564103* Desktop*	p		Undefined	Use of screen for printing of 1 invoice at home			
Laptop computer, at plant/GLO U	*0,7*0,000144092*0,002564103* (1-Desktop)*	p		Undefined	Use of Laptop for printing of 1 invoice at home			
Transport, transoceanic freight ship/OCE S	*0,7*Desktop*0,000105352* 0,002564103*(0,0113+0,00118+ 0,000120)*15000*	tkm		Undefined	Boat transport for desktop+keyboard+mouse+screen			
Transport, transoceanic freight ship/OCE S	*0,7*Desktop*0,000129299* 0,002564103*0,005075*15000*	tkm		Undefined				
Transport, transoceanic freight ship/OCE S	*0,7*(1-Desktop)*0,00014409 *0,002564103*0,00315*15000*	tkm		Undefined	Boat transport for Laptop			
Transport, lorry 16-32t, EURO3/RER S	*0,7*Desktop*0,000105352* 0,002564103*(0,0113+0,00118+ 0,000120)*500*	tkm		Undefined	Lorry transport for desktop+keyboard+mouse+screen			
Transport, lorry 16-32t, EURO3/RER S	*0,7*Desktop*0,000129299* 0,002564103*0,005075*500*	tkm		Undefined				
Transport, lorry 16-32t, EURO3/RER S	*0,7*(1-Desktop)*0,000144092 *0,002564103*0,00315*500*	tkm		Undefined	Lorry transport for Laptop			
Desktop computer, without screen, at plant/GLO U	*0,3*7,31315E-05 *0,002564103*Desktop*	p		Undefined	Use of desktop for printing of 1 invoice at office			

Keyboard, standard version, at plant/GLO U	*0,3*7,31315E-05 *0,002564103*Desktop*	p	Undefined	Use of keyboard for printing of 1 invoice at office
Mouse device, optical, with cable, at plant/GLO U	*0,3*7,31315E-05 *0,002564103*Desktop*	p	Undefined	Use of muose for printing of 1 invoice at office
LCD flat screen, 17 inches, at plant/GLO U	*0,3*6,44496E-05 *0,002564103*Desktop*	p	Undefined	Use of screen for printing of 1 invoice at office
Laptop computer, at plant/GLO U	*0,3*7,65404E-05*0,002564103* (1-Desktop)*	p	Undefined	Use of Laptop for printing of 1 invoice at office
Transport, transoceanic freight ship/OCE S	*0,3*Desktop*7,31315E-05 *0,002564103*(0,0113+0,00118+ 0,000120)*15000*	tkm	Undefined	Boat transport for desktop+keyboard+mouse+screen
Transport, transoceanic freight ship/OCE S	*0,3*Desktop*6,44496E-05* 0,002564103*0,005075*15000*	tkm	Undefined	
Transport, transoceanic freight ship/OCE S	*0,3*(1-Desktop)*7,65404E-05 *0,002564103*0,00315*15000*	tkm	Undefined	Boat transport for Laptop
Transport, lorry 16-32t, EURO3/RER S	*0,3*Desktop*7,31315E-05* 0,002564103*(0,0113+0,00118+ 0,000120)*500*	tkm	Undefined	Lorry transport for desktop+keyboard+mouse+screen
Transport, lorry 16-32t, EURO3/RER S	*0,3*Desktop*6,44496E-05* 0,002564103*0,005075*500*	tkm	Undefined	
Transport, lorry 16-32t, EURO3/RER S	*0,3*(1-Desktop)*7,65404E-05 *0,002564103*0,00315*500*	tkm	Undefined	Lorry transport for Laptop

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Disposal, desktop computer, to WEEE treatment/CH U	*0,7*0,000105352*0,002564103* Desktop*	p	Undefined	
Disposal, keyboard, standard version, to WEEE treatment/CH U	*0,7*0,000105352*0,002564103* Desktop*	p	Undefined	
Disposal, mouse device, optical, with cable, to WEEE treatment/CH U	*0,7*0,000105352*0,002564103* Desktop*	p	Undefined	
Disposal, LCD flat screen, 17 inches, to WEEE treatment/CH U	*0,7*0,000129299*0,002564103* Desktop*	p	Undefined	
Disposal, laptop computer, to WEEE treatment/CH U	*0,7*0,000144092*0,002564103* (1-Desktop)*	p	Undefined	
Disposal, desktop computer, to WEEE treatment/CH U	*0,3*7,31315E-05 *0,002564103*Desktop*	p	Undefined	
Disposal, keyboard, standard version, to WEEE treatment/CH U	*0,3*7,31315E-05 *0,002564103*Desktop*	p	Undefined	
Disposal, mouse device, optical, with cable, to WEEE treatment/CH U	*0,3*7,31315E-05 *0,002564103*Desktop*	p	Undefined	
Disposal, LCD flat screen, 17 inches, to WEEE treatment/CH U	*0,3*6,44496E-05 *0,002564103*Desktop*	p	Undefined	
Disposal, laptop computer, to WEEE treatment/CH U	*0,3*7,65404E-05*0,002564103* (1-Desktop)*	p	Undefined	

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:03:28
Project	Invoices Itella				

Process

Category type	Energy
Process identifier	Institut14008900087
Type	Unit process
Process name	**Electricity mix for Archive electronic invoice**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	
Collection method	Based on communication with Bo Westin at KTH September 2008
Data treatment	
Verification	
Comment	KTH Information is assumed to correspond to average
Allocation rules	
System description	

Products						
Electricity mix for Archive electronic invoice	*1*	p	100	not defined	Others\Electricity mix	
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity mix "CO2-cap" at grid	*CO2cap_el*345*87600* 3,6458E-09*		Wh	Undefined		Wh per invoice and year.
Electricity mix "high gas price" at grid	*(1-CO2cap_el)* 345*87600*3,6458E-09*		Wh	Undefined		Wh per invoice and year.
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	09:57:16
Project	Invoices Itella				

Process

Category type	Energy
Process identifier	Institut14008900080
Type	Unit process
Process name	**Electricity mix for XiB and E-archive**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	
Collection method	Based on communication with Tobias Wikström at Itella Information April - August 2008
Data treatment	
Verification	
Comment	Itella Information is assumed to correspond to average
Allocation rules	
System description	

Products						
Electricity mix for XiB and E-archive	*1*	p	100	not defined	Others\Electricity mix	
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity mix "CO2-cap" at grid	*CO2cap_el*max_faktura *0,0052*		kWh	Undefined		
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*max_faktura *0,0052*		kWh	Undefined		
Electricity mix "CO2-cap" at grid	*CO2cap_el*(1-max_faktura) *0,0026*		kWh	Undefined		
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*(1-max_faktura) *0,0026*		kWh	Undefined		
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	09:55:11	
Project	Invoices Itella					

Assembly:

Name

electronic invoice + print(1A4)

Materials/Assemblies

Printed electronic invoice 1A4 (New)	*4,9896*	g	Undefined			1 A4

Processes

XiB and E-archive (New)	*1*	p	Undefined			BtoB and BtoC
Internet infrastructure use per Mb	*3,5/1000*	p	Undefined			3.5 kB/invoice, BtoB electronic distribution

Input parameters

Calculated parameters

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	10:06:34	
Project	Invoices Itella					

Assembly:

Name

electronic invoice + print

Materials/Assemblies

Printed electronic invoice (New)	*4,9896*2*	g	Undefined			2 A4

Processes

XiB and E-archive (New)	*1*	p	Undefined			BtoB and BtoC
Internet infrastructure use per Mb	*3,5/1000*	p	Undefined			3.5 kB/invoice, BtoB electronic distribution

Input parameters

Calculated parameters

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	09:52:10
Project	Invoices Itella				

Life cycle:

Name

Electronic invoice system + print (1A4)

Assembly

electronic invoice + print(1A4)	*1400000000*	p	Undefined		BtoB and BtoC

Processes

Archive electronic invoice (New)	*1400000000*0,3*	p	Undefined		BtoB, 30% of all invoices
Extra time for e-handling at office, 5 min/invoice (New)	*extra_ehandling* 1400000000*0,3*	p	Undefined		

Waste/Disposal scenario

Paper waste scenario

Additional life cycles

Input parameters

Calculated parameters

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	10:06:15		
Project	Invoices Itella						

Life cycle:

Name

Electronic invoice system + print

Assembly

electronic invoice + print	*1400000000*	p	Undefined			BtoB and BtoC

Processes

Archive electronic invoice (New)	*1400000000*0,3*	p	Undefined			BtoB, 30% of all invoices
Extra time for e-handling at office, 5 min/invoice (New)	*extra_ehandling* 1400000000*0,3*	p	Undefined			

Waste/Disposal scenario

Paper waste scenario

Additional life cycles

Input parameters

Calculated parameters

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	10:11:26
Project	Invoices Itella				

Assembly:

Name

electronic invoice

Materials/Assemblies

Processes

XiB and E-archive (New)	*1*	p	Undefined		BtoB and BtoC
Internet infrastructure use per Mb	*3,5/1000*	p	Undefined		3.5 kB/invoice, BtoB electronic distribution

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:00:42
Project	Invoices Itella				

Process

Category type	Energy
Process identifier	Institut14008900107
Type	Unit process
Process name	**Elextricity mix for computer at printing (1A4)**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	Larsen et al 2006 page 193. Calculations based on energy use in sleep, off and active mode. Sleep and off mode allocated to the active mode.
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Elextricity mix for computer at printing (1A4)	*1*	*p*	100	not defined	Others\Electricity mix	
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity mix "CO2-cap" at grid	*0,3*CO2cap_el*Desktop* 0,001282051*118,6335865*	*Wh*		Undefined	(desktop+LCD, office) 118,6335865 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*0,3*(1-CO2cap_el)*Desktop *0,001282051*118,6335865*	*Wh*		Undefined	(desktop+LCD, office) 118,6335865 W (sleep+off+active)	
Electricity mix "CO2-cap" at grid	*0,3*CO2cap_el*(1-Desktop) *0,001282051*37,24856487*	*Wh*		Undefined	(laptop, office) 37,24856487 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*0,3*(1-CO2cap_el)*(1-Desktop) *0,001282051*37,24856487*	*Wh*		Undefined	(laptop, office) 37,24856487 W (sleep+off+active)	
Electricity mix "CO2-cap" at grid	*0,7*CO2cap_el*Desktop* 0,001282051*125,7839398*	*Wh*		Undefined	(desktop+LCD, home) 125,7839398 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*0,7*(1-CO2cap_el)*Desktop *0,001282051*125,7839398*	*Wh*		Undefined	(desktop+LCD, home) 125,7839398 W (sleep+off+active)	
Electricity mix "CO2-cap" at grid	*0,7*CO2cap_el*(1-Desktop) *0,001282051*43,10518732*	*Wh*		Undefined	(laptop, home) 43,10518732 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*0,7*(1-CO2cap_el)*(1-Desktop) *0,001282051*43,10518732*	*Wh*		Undefined	(laptop, home) 43,10518732 W (sleep+off+active)	
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:09:58
Project	Invoices Itella				

Process

Category type	Energy
Process identifier	Institut14008900096
Type	Unit process
Process name	**Elextricity mix for computer at printing**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	IVF (2007) page 193, calculations based on energy consumption at active, sleep and off mode for a compoter.
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Elextricity mix for computer at printing	*1*	p	100	not defined	Others\Electricity mix	
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity mix "CO2-cap" at grid	*0,3*CO2cap_el*Desktop* 0,002564103*118,6335865*		Wh	Undefined	(desktop+LCD, office) 118,6335865 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*0,3*(1-CO2cap_el)*Desktop *0,002564103*118,6335865*		Wh	Undefined	(desktop+LCD, office) 118,6335865 W (sleep+off+active)	
Electricity mix "CO2-cap" at grid	*0,3*CO2cap_el*(1-Desktop) *0,002564103*37,24856487*		Wh	Undefined	(laptop, office) 37,24856487 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*0,3*(1-CO2cap_el)*(1-Desktop) *0,002564103*37,24856487*		Wh	Undefined	(laptop, office) 37,24856487 W (sleep+off+active)	
Electricity mix "CO2-cap" at grid	*0,7*CO2cap_el*Desktop *0,002564103*125,7839398*		Wh	Undefined	(desktop+LCD, home) 125,7839398 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*0,7*(1-CO2cap_el)*Desktop *0,002564103*125,7839398*		Wh	Undefined	(desktop+LCD, home) 125,7839398 W (sleep+off+active)	
Electricity mix "CO2-cap" at grid	*0,7*CO2cap_el*(1-Desktop) *0,002564103*43,10518732*		Wh	Undefined	(laptop, home) 43,10518732 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*0,7*(1-CO2cap_el)*(1-Desktop) *0,002564103*43,10518732*		Wh	Undefined	(laptop, home) 43,10518732 W (sleep+off+active)	
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:04:20
Project	Invoices Itella				

Process

Category type	Processing
Process identifier	Institut14008900082
Type	Unit process
Process name	**Extra time for e-handling at office, 5 min/invoice (New)**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-03
Record	Clara Borggren
Generator	
Literature references	
Collection method	Own assumption of 5 minutes extra per electronic invoice.
Data treatment	
Verification	
Comment	Process box for assembling of incoming processess
Allocation rules	
System description	

Products						
Extra time for e-handling at office, 5 min/invoice (New)	*1*	p	100	not defined	E-communication	Corresponds to handling of one B-to-B electronic invoice
Avoided products						
Resources						
Materials/fuels						
Computer (prod, transport and waste man.) for office e-handling	*1*	p	Undefined			
Electricity/heat						
Elextricity mix for office e-handling	*1*	p	Undefined			
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:02:27
Project	Invoices Itella				

Process

Category type	Use
Process identifier	Institut14008900043
Type	Unit process
Process name	**Internet infrastructure use**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	Åsa Moberg
Generator	Based on information from Jens Malmodin at Ericsson Research. See main report Moberg et al (2008) for descirption of the data used.
Literature references	
Collection method	No construction or cables, only electricity for use!
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Internet infrastructure use per Mb	*1*	p	100	not defined	E-communication	1 piece of internet infrastructure use equals use for sending 1 Mb
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity mix "CO2-cap" at grid	*CO2cap_el*5,8*	Wh	Undefined	Rough calculation on fixed networks and transport networks operation and total transport, bit-traffic in access network. (Based on figures provided by Jens Malmodin, Ericsson)		
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*5,8*	Wh	Undefined	Rough calculation on fixed networks and transport networks operation and total transport, bit-traffic in access network (Based on figures provided by Jens Malmodin, Ericsson)		
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:05:17
Project	Invoices Itella				

Process

Category type	Waste scenario
Process identifier	Institut14008900059
Type	Unit process
Process name	**Paper waste scenario**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-01
Record	Åsa Moberg
Generator	
Literature references	
Collection method	Own assumption. Long transport 900 km, short transport 100 km.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Waste scenario						
Paper waste scenario	*1*	kg	All waste types	Others		Paper for printed electronic invoices
Materials/fuels						
Transport, lorry 16-32t, EURO3/RER S	*long_transport*0,001*0,66*900*		tkm	Undefined		paper to recycling
Transport, lorry 16-32t, EURO3/RER S	*(1-long_transport) *0,001*0,66*100*		tkm	Undefined		paper to recycling
Transport, lorry 16-32t, EURO3/RER S	*long_transport *0,001*0,34*100*		tkm	Undefined		paper to incineration
Transport, lorry 16-32t, EURO3/RER S	*(1-long_transport) *0,001*0,34*50*		tkm	Undefined		paper to incineration
Electricity/heat						
Separated waste						
Disposal, paper, 11.2% water, to municipal incineration/CH U (SE efficaincy incl avoided energy)	All waste types	*34*	%			
Recycling paper/RER U incl benefits and costs	All waste types	*66*	%			
Remaining waste						
Unspecified		*100*	%			
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	09:55:35
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900104
Type	Unit process
Process name	**Printed electronic invoice (1A4)**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-05
Record	Clara Borggren
Generator	
Literature references	
Collection method	Calculations based on 1A4. 13 A4 pages are printed per minute. Ref Hischier et al 2007. Ecoinvent vol No 18.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Printed electronic invoice 1A4 (New)	*4,9896*	g	100	not defined	Media	1 A4-page, printed on 1 side
Avoided products						
Resources						
Materials/fuels						
Paper, woodfree, uncoated, at integrated mill/RER U (Electricity mix)	*4,9896*1,05*	g	Undefined	Assuming 5% waste		
Use, printer, laser jet, b/w, per kg printed paper/CH U (electricity mix)	*5,24*	g	Undefined			
Computer (prod, transport and waste man.) for printing (1A4)	*1*	p	Undefined	Corresponds to the share of a computer used for this process.		
Transport of printing paper	*print_transport*	p	Undefined	Transport of paper, non printed, from store to printer. One invoice = 1A4		
Transport, lorry 16-32t, EURO3/RER S	*5,24*100/1000000*	tkm	Undefined	Transport of paper, non-printed, from plant to store. 100km		
Electricity/heat						
Elextricity mix for computer at printing (1A4)	*1*	p	Undefined	Corresponds to energy use for computer used for this process.		
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						

Waste to treatment				
Recycling paper/RER U incl benefits and costs	*0,66*0,53*	g	Undefined	
Disposal, paper, 11.2% water, to municipal incineration/CH U (SE efficaincy incl avoided energy)	*0,34*0,53*	g	Undefined	
Disposal, printer, laser jet, b/w, to WEEE treatment/CH S	*1/748800*	p	Undefined	Should have been 1/(748800*2) since each invoice in this case is only 1 A4page. This difference is assumed to have no influence on the result as the waste

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:08:49
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900094
Type	Unit process
Process name	**Printed electronic invoice**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-05
Record	Åsa Moberg/Clara Borggren
Generator	
Literature references	
Collection method	Calculations based on litterature. Ecoinvent vol 18, printer use. Printer able to print 13 A4 pages per minute.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Printed electronic invoice (New)	*4,9896*2*	g	100	not defined	Media	2 A4-pages, printed on 1 side
Avoided products						
Resources						
Materials/fuels						
Paper, woodfree, uncoated, at integrated mill/RER U (Electricity mix)	*9,98*1,05*	g	Undefined	Assuming 5% waste		
Use, printer, laser jet, b/w, per kg printed paper/CH U (electricity mix)	*10,5*	g	Undefined			
Computer (prod, transport and waste man.) for printing	*1*	p	Undefined	Corresponds to the share of a computer used for this process.		
Transport of printing paper	*print_transport*2*	p	Undefined	Transport of paper, non-printed, from store to printer. One invoice = 2A4		
Transport, lorry 16-32t, EURO3/RER S	*10,5*100/1000000*	tkm	Undefined	Transport of paper, non-printed, from plant to store. 100km		
Electricity/heat						
Elextricity mix for computer at printing	*1*	p	Undefined	Corresponds to energy use for computer used for this process.		
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						

Recycling paper/RER U incl benefits and costs	*0,66*0,53*	g	Undefined	
Disposal, paper, 11.2% water, to municipal incineration/CH U (SE efficaincy incl avoided energy)	*0,34*0,53*	g	Undefined	
Disposal, printer, laser jet, b/w, to WEEE treatment/CH S	*1/748800*	p	Undefined	I invoice is 1/748800 of the total use of the printer during its life time. Based on data from the Ecoinvent report concerning the Printer.

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:03:03
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900086
Type	Unit process
Process name	**Server prod, transport and waste man. for e-archive**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	
Collection method	Based on communication with Bo Westin at KTH September 2008
Data treatment	
Verification	
Comment	KTH Information is assumed to correspond to average
Allocation rules	
System description	

Products						
Server prod, transport and waste man. for e-archive	*1*	p	100	not defined	Electronics \Devices	1 p means the share of server used for one electronic invoice.
Avoided products						
Resources						
Materials/fuels						
Desktop computer, without screen, at plant/GLO S	*3,6458E-9*2*		p	Undefined	1 server assumed to eqaul 2 desktop computers	
Transport, transoceanic freight ship/OCE S	*3,6458E-9*0,0113*2*15000*		tkm	Undefined	Boat transport for server	
Transport, lorry 16-32t, EURO3/RER S	*3,6458E-9*0,0113*2*500*		tkm	Undefined	Lorry transport for server	
Electricity/heat						
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Disposal, desktop computer, to WEEE treatment/CH S	*2,1875E-9*2*		p	Undefined		
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	09:56:35
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900079
Type	Unit process
Process name	**Server prod. and waste man. for XiB and E-archive**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren
Generator	
Literature references	
Collection method	Based on communication with Tobias Wikström at Itella Information April - August 2008
Data treatment	
Verification	
Comment	Itella Information is assumed to correspond to average
Allocation rules	
System description	

Products							
Server prod. and waste man. for XiB and E-archive	*1*	p	100	not defined	Electronics \Devices	Corresponds to one electronic invoice.	
Avoided products							
Resources							
Materials/fuels							
Desktop computer, without screen, at plant/GLO S	*2*max_faktura*2/(3000000*10)*	p	Undefined				2 stationary computers are used as approximation for servers
Desktop computer, without screen, at plant/GLO S	*2*(1-max_faktura) *2/(3000000*20)*	p	Undefined				2 stationary computers are used as approximation for servers
Transport, transoceanic freight ship/OCE S	*2*max_faktura* *2/(3000000*10)*0,0113*15000*	tkm	Undefined				Boat transport for server
Transport, lorry 16-32t, EURO3/RER S	*2*max_faktura* *2/(3000000*10)*0,0113*500*	tkm	Undefined				Lorry transport for server
Transport, transoceanic freight ship/OCE S	*2*(1-max_faktura)* *2/(3000000*20)*0,0113*15000*	tkm	Undefined				Boat transport for server
Transport, lorry 16-32t, EURO3/RER S	*2*(1-max_faktura)* *2/(3000000*20)*0,0113*500*	tkm	Undefined				Lorry transport for server
Electricity/heat							
Emissions to air							
Emissions to water							
Emissions to soil							
Final waste flows							
Non material emissions							
Social issues							

Economic issues

Waste to treatment

Disposal, desktop computer, to WEEE treatment/CH S	*2*max_faktura*2/(3000000*10)*	p	Undefined			stationary computers are used as approximation for servers
Disposal, desktop computer, to WEEE treatment/CH S	*2*(1-max_faktura)* 2/(3000000*20)*	p	Undefined			

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:00:07
Project	Invoices Itella				

Process

Category type	Transport
Process identifier	Institut14008900103
Type	Unit process
Process name	**Transport of printing paper**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-10-02
Record	Clara Borggren
Generator	
Literature references	
Collection method	Own assumption. 2 km drive to by a package of 500 A4.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

Transport of printing paper	*1*	p	100	not defined	Road	1A4

Avoided products

Resources

Materials/fuels

Transport, passenger car, ethanol 5%/CH U	*2/500*	personkm	Undefined			

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	09:56:03
Project	Invoices Itella				

Process

Category type	Processing
Process identifier	Institut14008900039
Type	Unit process
Process name	**XiB and E-archive**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-29
Record	Åsa Moberg/Clara Borggren
Generator	
Literature references	
Collection method	Based on communication with Tobias Wikström at Itella Information April - August 2008. XiB and E-archive are server environments.
Data treatment	
Verification	
Comment	Process box for assembling of incoming processess
Allocation rules	
System description	

Products						
XiB and E-archive (New)	*1*	p	100	not defined	E-communication	1 electronic invoice is assumed to deliver the same information as a 2 A4 paper invoice. The size of the electronic invoice is 3,5kB
Avoided products						
Resources						
Materials/fuels						
Server prod. and waste man. for XiB and E-archive	*1*	p	Undefined		Corresponds to one electronic invoice.	
Electricity/heat						
Electricity mix for XiB and E-archive	*1*	p	Undefined		Corresponds to one electronic invoice.	
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

Paper invoice system

SimaPro 7.1	Process	Date:	2008-11-19	Time:	10:44:38
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900019
Type	
Process name	**2-bromo-2-nitropropane-1,3-diol NO DATA**
Status	Finiched
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

2-bromo-2-nitropropane-1,3-diol NO DATA	*1*	kg	100	not defined	Chemicals\Printing chemicals	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-19	Time:	12:29:51
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900005
Type	
Process name	**2-diazo-1(2H)-naphtalinon-derivate NO DATA**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-25
Record	Åsa Moberg
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

2-diazo-1(2H)-naphtalinon-derivate NO DATA	*1*	kg	100	not defined	Chemicals\Printing chemicals	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-19	Time:	10:42:20
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900013
Type	
Process name	**2-methyl-3-isothiazolon NO DATA**
Status	
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

2-methyl-3-isothiazolon NO DATA	*1*	kg	100	not defined	Chemicals\Printing chemicals	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-19	Time:	10:43:26
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900012
Type	
Process name	**5-chlor-2-methyl-3-isothiazolon NO DATA**
Status	
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

5-chlor-2-methyl-3-isothiazolon NO DATA	*1*	kg	100	not defined	Chemicals\Printing chemicals	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	11:01:23
Project	Invoices Itella				

Process

Category type	Use
Process identifier	Institut14008900061
Type	Unit process
Process name	**Archive paper invoice**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-11
Record	Clara Borggren
Generator	Thomas Mullo, KTH
Literature references	
Collection method	
Data treatment	
Verification	
Comment	There is option for storing 54 000 more A4 document per 70m2, this was not considered in the current study. 118 kWh per year and m2 for heating of offices (SCB 2007) is used. No energy use for potential humidity control included. The composition of heat is based on Sahlin et al. (2004) as described in the main report (Moberg et al. 2008).
Allocation rules	
System description	

Products						
Archive paper invoice	*1*	p	100	not defined	Administration	1 invoice = 2A4
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Heat, at cogen 6400kWth, wood, allocation energy/CH S	*(1-max_arch_paper)* 0,006373*0,7621*10*		kWh	Undefined	Heating of the surface for 1 invoice. 0,006373 kWh/year. 10 year in archive	
Heat, at cogen 500kWe lean burn, allocation energy/CH S	*(1-max_arch_paper)* 0,006373*0,2379*10*		kWh	Undefined	Heating of the surface for 1 invoice. 0,006373 kWh/year. 10 year in archive	
Heat, at cogen 6400kWth, wood, allocation energy/CH S	*max_arch_paper* 0,006243*0,7621*10*		kWh	Undefined	Heating of the surface for 1 invoice. 0,006243 kWh/year. 10 year in archive, with maxium usage of storage per m2	
Heat, at cogen 500kWe lean burn, allocation energy/CH S	*max_arch_paper* 0,006243*0,2379*10*		kWh	Undefined	Heating of the surface for 1 invoice. 0,006243 kWh/year. 10 year in archive, with maximum usage of storage per m2	
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-19	Time:	12:33:48
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900007
Type	
Process name	**Citric Acid NO DATA**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	Åsa Moberg
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

Citric acid NO DATA	*1*	kg	100	not defined	Chemicals\Acids (organic)	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-19	Time:	10:46:00
Project	Invoices Itella				

Process

Category type	Processing
Process identifier	Institut14008900016
Type	Unit process
Process name	**Cleaning offset printer**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	Clara Borggren/Åsa Moberg
Generator	Larsen et al. 2006
Literature references	Larsen et al 2006
	The inventory is based on the report by Larsen et al 2006. As the focus of the study is cumulative energy use and greenhouse gas emissions all other emissions are not covered (since all data where not easily understandable in Annex B.
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Cleaning offset printer	*1*	p	100	not defined	Printing\Media	Related to 1 ton shed fed offset printed matter
Avoided products						
Resources						
Materials/fuels						
Soya oil, at plant/RER S	*0,61*	kg	Undefined			
Paraffin, at plant/RER S	*0,61*	kg	Undefined	"n-paraffins (heavy)"		
Paraffin, at plant/RER S	*0,609*	kg	Undefined	"n-paraffins (light)"		
Benzene, at plant/RER S	*0,00061*	kg	Undefined			
Ethoxylated alcohols (AE3), petrochemical, at plant/RER S	*0,05*	kg	Undefined	Alcoholethoxylate (undecyletherpolyoxy - ethylen (5))		
Ethanol from ethylene, at plant/RER S	*0,61*	kg	Undefined	Assumed 26,8 MJ/kg, 0,61kg		
Electricity/heat						
Emissions to air						
Paraffins	*1*	kg	Undefined			
Benzene	*0,00058*	kg	Undefined			
Ethanol	*0,58*	kg	Undefined			
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						

Waste to treatment					
Disposal, hazardous waste, 25% water, to hazardous waste incineration/CH S	*0,87*	kg	Undefined		"chemical waste"
Treatment, sewage, to wastewater treatment, class 1/CH S	*0,000044*	m3	Undefined		Assumed 1000 kg/m3, 0,044 kg

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:37:31
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900089
Type	Unit process
Process name	**Computer (prod, transport and waste man.) for Data capture**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren/Åsa Moberg
Generator	
Literature references	
Collection method	PC use for scanning and verification of paper invoices based on inforamtion from Gunnar Rogeman at Itella Information.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Computer (prod, transport and waste man.) for Data capture	*1*	p	100	not defined	Electronics \Devices	1 p = computer use for 1 paper invoice data capture
Avoided products						
Resources						
Materials/fuels						
Desktop computer, without screen, at plant/GLO S	*Desktop*1,1E-6*	p		Undefined		
LCD flat screen, 17 inches, at plant/GLO S	*Desktop*1,1E-6*	p		Undefined		
Keyboard, standard version, at plant/GLO S	*Desktop*1,1E-6*	p		Undefined		
Mouse device, optical, with cable, at plant/GLO S	*Desktop*1,1E-6*	p		Undefined		
Laptop computer, at plant/GLO S	*(1-Desktop)*1,1E-6*	p		Undefined		
Transport, transoceanic freight ship/OCE S	*Desktop*1,1E-6*(0,0113+0,00118 +0,000120 +0,005075)*15000*	tkm		Undefined	Boat transport for desktop+keyboard+mouse+screen	
Transport, transoceanic freight ship/OCE S	*(1-Desktop)*1,1E-6 *0,00315*15000*	tkm		Undefined	Boat transport for Laptop	
Transport, lorry 16-32t, EURO3/RER S	*Desktop*1,1E-6*(0,0113+0,00118 +0,000120 +0,005075)*500*	tkm		Undefined	Lorry transport for desktop+keyboard+mouse+screen	
Transport, lorry 16-32t, EURO3/RER S	*(1-Desktop)*1,1E-6 *0,00315*500*	tkm		Undefined	Lorry transport for Laptop	
Electricity/heat						
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						

Non material emissions

Social issues

Economic issues

Waste to treatment

Disposal, desktop computer, to WEEE treatment/CH S	*Desktop*1,1E-6*	p	Undefined		
Disposal, laptop computer, to WEEE treatment/CH S	*(1-Desktop)*1,1E-6*	p	Undefined		
Disposal, keyboard, standard version, to WEEE treatment/CH S	*Desktop*1,1E-6*	p	Undefined		
Disposal, LCD flat screen, 17 inches, to WEEE treatment/CH S	*Desktop*1,1E-6*	p	Undefined		
Disposal, mouse device, optical, with cable, to WEEE treatment/CH S	*Desktop*1,1E-6*	p	Undefined		

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:53:31
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900092
Type	Unit process
Process name	**Computer (prod. transport and waste man.) for consumer invoice handling**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Åsa Moberg
Generator	
Literature references	IVF (2007) p. 101 and 104
Collection method	Share of total use of computers. Total use figures from IVF (2007).
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Computer (prod. transport and waste man.) for consumer invoice handling	*1*	p	100	not defined	Electronics \Devices	Corresponds to 10 seconds use.
Avoided products						
Resources						
Materials/fuels						
Desktop computer, without screen, at plant/GLO U	*0,000105352*10/3600*Desktop*	p		Undefined		
Keyboard, standard version, at plant/GLO U	*0,000105352*10/3600*Desktop*	p		Undefined		
Mouse device, optical, with cable, at plant/GLO U	*0,000105352*10/3600*Desktop*	p		Undefined		
LCD flat screen, 17 inches, at plant/GLO U	*0,000129299*10/3600*Desktop*	p		Undefined		
Laptop computer, at plant/GLO U	*0,000144092*10/3600* (1-Desktop)*	p		Undefined		
Transport, transoceanic freight ship/OCE S	*Desktop*0,000105352*10/3600* (0,0113+0,00118+0,000120) *15000*	tkm		Undefined	Boat transport for desktop+keyboard+mouse+screen	
Transport, transoceanic freight ship/OCE S	*Desktop*0,000129299*10/3600* 0,005075*15000*	tkm		Undefined		
Transport, transoceanic freight ship/OCE S	*(1-Desktop)*0,000144092 *10/3600*0,00315*15000*	tkm		Undefined	Boat transport for Laptop	
Transport, lorry 16-32t, EURO3/RER S	*Desktop*0,000105352*10/3600* (0,0113+0,00118+0,000120) *500*	tkm		Undefined	Lorry transport for desktop+keyboard+mouse+screen	
Transport, lorry 16-32t, EURO3/RER S	*Desktop*0,000129299*10/3600 *0,005075*500*	tkm		Undefined		
Transport, lorry 16-32t, EURO3/RER S	*(1-Desktop)*0,000144092 *10/3600*0,00315*500*	tkm		Undefined	Lorry transport for Laptop	
Electricity/heat						
Emissions to air						

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Disposal, desktop computer, to WEEE treatment/CH U	*0,000105352*10/3600*Desktop*	p	Undefined	
Disposal, keyboard, standard version, to WEEE treatment/CH U	*0,000105352*10/3600*Desktop*	p	Undefined	
Disposal, mouse device, optical, with cable, to WEEE treatment/CH U	*0,000105352*10/3600*Desktop*	p	Undefined	
Disposal, LCD flat screen, 17 inches, to WEEE treatment/CH U	*0,000129299*10/3600*Desktop*	p	Undefined	
Disposal, laptop computer, to WEEE treatment/CH U	*0,000144092*10/3600* (1-Desktop)*	p	Undefined	

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:50:17
Project	Invoices Itella				

Process

Category type	Use
Process identifier	Institut14008900048
Type	Unit process
Process name	**Construction Internet infrastructure per subscriber**
Status	
Time period	1995-1999
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-03
Record	Åsa Moberg
Generator	TeliaSonera
Literature references	
Collection method	Personal communication with Dag Lundén at TeliaSonera during 2008. The emission figures are based on a report by Tingstorp 1998, as reviewed by Lindroth 1999. The allocation per subscriber is a rough estimate and is probably an overestimation as there are probably more users. Production of fibre cable is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Construction Internet infrastructure per subscriber	*1*	p	100	not defined	E-communication	One piece equals one subscription
Avoided products						
Resources						
Materials/fuels						
Copper cable per km, average for Telecom	*900000/5428000/35*		km	Undefined	900 000 km cupper cable (Telia Sonera), Subscribers broadband and fixed voice 5428000, (probably too low figure). Life time of cable 35 years appr.
Electricity/heat						
Emissions to air						
Carbon dioxide	*5703109,6* (900000/5428000/35)*		g	Undefined	Cupper cable, g/subscriber is probably an overestimation since the number of users is probebly too low.
Carbon dioxide	*5703109,6* (62535/5428000/35)*		g	Undefined	Fibre cable, g/subscriber is probably an overestimation since the number of users is probably too low.
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	11:07:05
Project	Invoices Itella				

Process

Category type	Use
Process identifier	Institut14008900102
Type	Unit process
Process name	**Consumer paper invoice handling (1 min extra internet use)**
Status	Finished
Time period	Unspecified
Geography	Europe, Western
Technology	Unspecified
Representativeness	Estimate
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-28
Record	Åsa Moberg
Generator	
Literature references	
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Consumer paper invoice handling (1 min)	*1*	p	100	not defined	E-communication	1 p equals one invoice (1 min extra internet use)
Avoided products						
Resources						
Materials/fuels						
Internet use per hour of use	*1/60*	hr	Undefined			
Construction Internet infrastructure per subscriber	*(1/60)/973*	p	Undefined		973 hours is the average total use of Internet per household in Sweden.	
Computer (prod. transport and waste man.) for consumer invoice handling	*6*	p	Undefined		The 1 p of the process corresponds to 10 seconds of extra use. Thus 6 pieces for 1 min extra use.	
Electricity/heat						
Electricity mix computer use for consumer invoice handling	*6*	p	Undefined		The 1 p of the process corresponds to 10 seconds of extra use. Thus 6 pieces for 1 min extra use.	
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:41:25
Project	Invoices Itella				

Process

Category type	Use
Process identifier	Institut14008900091
Type	Unit process
Process name	**Consumer paper invoice handling (10 seconds extra internet use)**
Status	Finished
Time period	Unspecified
Geography	Europe, Western
Technology	Unspecified
Representativeness	Estimate
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-28
Record	Åsa Moberg
Generator	
Literature references	
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Consumer paper invoice handling (New)	*1*	p	100	not defined	E-communication	1 p equals one invoice (10 s extra use)
Avoided products						
Resources						
Materials/fuels						
Internet use per hour of use	*10/3600*	hr	Undefined			
Construction Internet infrastructure per subscriber	*(10/3600)/973*	p	Undefined		973 hours is the average total use of Internet per household in Sweden.	
Computer (prod. transport and waste man.) for consumer invoice handling	*1*	p	Undefined		Corresponds to 10 seconds of use.	
Electricity/heat						
Electricity mix computer use for consumer invoice handling	*1*	p	Undefined		Corresponds to 10 seconds of use.	
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:49:24
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900063
Type	Unit process
Process name	**Copper cable, average for Telecom**
Status	Finished
Time period	1995-1999
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-03
Record	Åsa Moberg
Generator	Telia Sonera, Dag Lundén and Arne Ernbo
Literature references	
Collection method	Material composition from TeliaSonera, data for 2005, Energy use from Walenius Henriksson 1997, as cited by Dag Lundén TeliaSonera (not published). Energy use for production of cupper cable (EUALEV)
Data treatment	
Verification	
Comment	No data on plastics.
Allocation rules	
System description	

Products						
Copper cable per km, average for Telecom	*1*	km	100	not defined	Electronics\ Others	800 kg/km
Avoided products						
Resources						
Materials/fuels						
Copper, at regional storage/RER S	*367/35*	kg		Undefined		
Aluminium, production mix, at plant/RER S	*31/35*	kg		Undefined		
Electricity/heat						
Electricity mix "CO2-cap" at grid	*CO2cap_el*587,05/35*	kWh		Undefined	Cupper cabls (EUALEW) (Walenius Henriksson 1997, according to Dag Lundén, Telia Sonera)	
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*587,05/35*	kWh		Undefined		
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:41:09
Project	Invoices Itella				

Process

Category type	Use
Process identifier	Institut14008900088
Type	Unit process
Process name	**Data capture incl scanning and verification (New)**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-27
Record	Clara Borggren/Åsa Moberg
Generator	
Literature references	
Collection method	
Data treatment	
Verification	
Comment	Process box for assembling the incoming processes. No data on production and waste management of scannning equipment
Allocation rules	
System description	

Products						
Data capture incl scanning and verification (New)	*1*	p	100	not defined	Administration	1 p = 1 paper invoice data capture
Avoided products						
Resources						
Materials/fuels						
Computer (prod, transport and waste man.) for Data capture	*1*	p	Undefined			
Electricity/heat						
Electricity mix for Data capture	*1*	p	Undefined			
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-14	Time:	13:52:47
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900037
Type	Unit process
Process name	**Digital printing and enveloping of invoice**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-28
Record	Åsa Moberg /Clara Borggren
Generator	
Literature references	
Collection method	Based on information from Gunnar Rogeman at Itella Information, 2008 and own assumptions.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products							
Digital printing and enveloping of invoice	*4,9896*2*	g	100	not defined	Media	2 A4-paper	Assumed A4 paper, 80 g/m2, printed on both sides. Assumed that paper used is pre-printed in offset. 1 A4=210 x 297mm=0,06237m2. 0,06237*80=4,9896g.
Avoided products							
Resources							
Materials/fuels							
Paper, woodfree, uncoated, at integrated mill/RER U (Electricity mix)	*5,0943816*2*0,33*	g		Undefined	Including a 2,1% paper waste. 4,9896g*1,021=5,0943816g, 1/3 not offset printed		
Offset printing	*5,0943816*2*0,67*	g		Undefined	Including a 2,1% paper waste. 4,9896g*1,021=5,0943816g, 2/3 offset printed before		
Toner, black, powder, at plant/GLO S	*25/500*	g		Undefined	appr 25g/1000 pages		
Transport, lorry 16-32t, EURO3/RER S	*long_transport*500*5,0943816*2* 0,67/1000000*	tkm		Undefined	Transport of offset printed paper, 500km		
Transport, lorry 16-32t, EURO3/RER S	*(1-long_transport) *50*5,0943816*2*0,67/1000000*	tkm		Undefined	Transport of offset printed paper, 50km		
Transport, lorry 16-32t, EURO3/RER S	*long_transport*900*5,0943816*2* 0,33/1000000*	tkm		Undefined	Transport of paper, non-printed, 900km		
Transport, lorry 16-32t, EURO3/RER S	*(1-long_transport) *100*5,0943816*2*0,33/1000000*	tkm		Undefined	Transport of paper, non-printed, 100km		
Electricity/heat							
Electricity mix "CO2-cap" at grid	*CO2cap_el*11*	Wh		Undefined	Electricity will be varied. Average of two Itella printing sites including digital printing and "enveloping"		
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*11*	Wh		Undefined	Electricity will be varied. Average of two Itella printing sites including digital printing and "enveloping"		
Emissions to air							
Emissions to water							

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Recycling paper/RER U incl benefits and costs	*10,2-9,98*	g	Undefined		Waste paper - 2.1% over consumption "makulatur". All to recycling assumed.

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:57:37
Project	Invoices Itella				

Process

Category type	Energy
Process identifier	Institut14008900093
Type	Unit process
Process name	**Electricity mix computer use for consumer invoice handling**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Clara Borggren/Åsa Moberg
Generator	
Literature references	IVF (2007) p 101 and 193.
Collection method	Data on computer effects and use from IVF (2007)
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Electricity mix computer use for consumer invoice handling	*1*	p	100	not defined	Others\ Electricity mix	Corresponds to 10 s of use.
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity mix "CO2-cap" at grid	*CO2cap_el*Desktop*10/3600* 125,7839*	Wh	Undefined		(desktop+LCD) 125,7839 W (sleep+off+sctive)	
Electricity mix "high gas price" at grid	*(1-CO2cap_el) *Desktop*10/3600*125,7839*	Wh	Undefined		(desktop+LCD) 125,7839 W (sleep+off+sctive)	
Electricity mix "CO2-cap" at grid	*CO2cap_el*(1-Desktop) *10/3600*43,1052*	Wh	Undefined		(laptop) 43,1052 W (sleep+off+active)	
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*(1-Desktop) *10/3600*43,1052*	Wh	Undefined		(laptop) 43,1052 W (sleep+off+active)	
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:39:35
Project	Invoices Itella				

Process

Category type	Energy
Process identifier	Institut14008900090
Type	Unit process
Process name	**Electricity mix for Data capture**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-24
Record	Åsa Moberg
Generator	
Literature references	
Collection method	Based on information on scanning and verification from Gunnar Rogeman at Itella Information.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Electricity mix for Data capture	*1*	p	100	not defined	Others\ Electricity mix	1p = electriicty use for data capture of one paper invoice
Avoided products						
Resources						
Materials/fuels						
Electricity/heat						
Electricity mix "CO2-cap" at grid	*CO2cap_el*0,27*	Wh		Undefined		Scanning. Electricity will be varied
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*0,27*	Wh		Undefined		Scanning. Electricity will be varied
Electricity mix "CO2-cap" at grid	*Desktop*CO2cap_el*1*	Wh		Undefined		Verification. Electricity will be varied
Electricity mix "high gas price" at grid	*Desktop*(1-CO2cap_el)*1*	Wh		Undefined		Verification. Electricity will be varied
Electricity mix "CO2-cap" at grid	*(1-Desktop)*CO2cap_el*0,315*	Wh		Undefined		Verification. Electricity will be varied
Electricity mix "high gas price" at grid	*(1-Desktop)*(1-CO2cap_el) *0,315*	Wh		Undefined		Verification. Electricity will be varied
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						
Waste to treatment						
Input parameters						
Calculated parameters						

SimaPro 7.1	Process	Date:	2008-11-14	Time: 15:55:34
Project	Invoices Itella			

Process

Category type	Material
Process identifier	Institut14008900027
Type	Unit process
Process name	**Glue, no impact**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	Åsa Moberg/Clara Borggren
Generator	
Literature references	
Collection method	
Data treatment	
Verification	
Comment	No data - information missing for glue production
Allocation rules	
System description	

Products

Glue, no impact NO DATA	*1*	kg	100	not defined	Chemicals\Others		

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	10:44:00
Project	Invoices Itella				

Process

Category type	Use
Process identifier	Institut14008900060
Type	Unit process
Process name	**Internet use per hour of use**
Status	Finished
Time period	2005-2009
Geography	World
Technology	Average technology
Representativeness	Estimate
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-03
Record	Åsa Moberg
Generator	
Literature references	
Collection method	Based on personal communication with Jens Malmodin at Ericsson Research
Data treatment	
Verification	
Comment	The modem and the DSLAM are the major energy consumer for internet use. The energy use of servers and data centres is not included, as the servers are separately modelled as XiB and E-archive. Some energy use for other servers and data centres used as internet is used may be missing.
Allocation rules	
System description	

Products					
Internet use per hour of use	*1*	hr	100	not defined	E-communication
Avoided products					
Resources					
Materials/fuels					
Electricity/heat					
Electricity mix "CO2-cap" at grid	*CO2cap_el*18*		Wh	Undefined	Use of modem (9 W), DSLAM (5W), Intenet operator (1W), Transport and transmission (3 W)
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*18*		Wh	Undefined	Use of modem (9 W), DSLAM (5W), Intenet operator (1W), Transport and transmission (3 W)
Electricity mix "CO2-cap" at grid	*CO2cap_el*18*1/973*7787*		Wh	Undefined	Share of non-use time for modem (6 W), DSLAM (5W), Internet operator (1W), Transport and transmission (3 W)
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*18*1/973*7787*		Wh	Undefined	Share of non-use time for modem (6 W), DSLAM (5W), Internet operator (1W), Transport and transmission (3 W)
Emissions to air					
Emissions to water					
Emissions to soil					
Final waste flows					
Non material emissions					
Social issues					
Economic issues					
Waste to treatment					
Input parameters					
Calculated parameters					

SimaPro 7.1	Process	Date:	2008-11-19	Time:	12:33:09
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900006
Type	
Process name	**Na2SiO3 NO DATA**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-25
Record	
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

Na2SiO3 NO DATA	*1*	kg	100	not defined	Chemicals\Printing chemicals	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-19	Time:	12:35:01
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900008
Type	
Process name	**Na-dodecyl-diphenyloxid-disulphonate NO DATA**
Status	
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Na-dodecyl-diphenyloxid-disulphonate NO DATA	*1*	kg	100	not defined	Chemicals\Printing chemicals	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-14	Time:	15:23:15
Project	Invoices Itella				

Process

Category type	Processing
Process identifier	Institut14008900018
Type	Unit process
Process name	**Offset printing**
Status	Finished
Time period	2000-2004
Geography	Europe, Western
Technology	Average technology
Representativeness	Average from processes with similar outputs
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	Clara Borggren/Åsa Moberg
Generator	Larsen et al. 2006
Literature references	Larsen et al 2006
	The inventory is based on the report by Larsen et al 2006. As the focus of the study is cumulative energy use and greenhouse gas emissions all other emissions are not covered (since all data where not easily understandable in Annex B).
Collection method	
Data treatment	
Verification	
Comment	Sheet fed offset printing. We have assumed no use of film for repro and no finishing.
Allocation rules	
System description	

Products							
Offset printing	*1*	ton	100	not defined	Printing\Media		
Avoided products							
Resources							
Materials/fuels							
Isopropanol, at plant/RER S	*3,93*	kg		Undefined			IPA
Printing colour, offset, 47.5% solvent, at plant/RER S	*5,8*	kg		Undefined			
Water, decarbonised, at plant/RER S	*0,94*	kg		Undefined			"Water" in Fountain solution
Isopropanol, at plant/RER S	*0,03*	kg		Undefined			in Fountain solution
Diethylene glycol, at plant/RER S	*0,03*	kg		Undefined			in Fountain solution
2-methyl-3-isothiazolon NO DATA	*0,000151*	kg		Undefined			in Fountain solution
5-chlor-2-methyl-3-isothiazolon NO DATA	*0,000452*	kg		Undefined			in Fountain solution
2-bromo-2-nitropropane-1,3-diol NO DATA	*0,00251*	kg		Undefined			in Fountain solution
Cleaning offset printer	*1*	p		Undefined			
Water, decarbonised, at plant/RER S	*28,83*	kg		Undefined			Water for dilution
Printing plate, offset	*4,16*	m2		Undefined			
Transport, lorry 16-32t, EURO3/RER S	*long_transport*7,2*	tkm		Undefined			
Transport, lorry 16-32t, EURO3/RER S	*(1-long_transport)*0,8*	tkm		Undefined			
Paper, woodfree, uncoated, at integrated mill/RER U (Electricity mix)	*1196,7*	kg		Undefined			
Electricity/heat							
Heat, light fuel oil, at boiler 10kW condensing, non-modulating/CH S	*885,6*	MJ		Undefined			Assumed 41 MJ/kg
Heat, natural gas, at boiler atm. low-NOx condensing non-modulating	*324*	MJ		Undefined			Assumed 51,9 MJ/kg
Heat, at cogen 6400kWth, wood, allocation energy/CH S	*633,6*0,7621*	MJ		Undefined			District heating
Heat, at cogen 500kWe lean burn, allocation energy/CH S	*633,6*0,2379*	MJ		Undefined			District heating

Electricity mix "high gas price" at grid	*(1-CO2cap_el)*705,324*		kWh	Undefined			
Electricity mix "CO2-cap" at grid	*CO2cap_el*705,324*		kWh	Undefined			
Emissions to air							
VOC, volatile organic compounds	*3,392*		kg	Undefined			"IPA"
Emissions to water							
Emissions to soil							
Final waste flows							
Non material emissions							
Social issues							
Economic issues							
Waste to treatment							
Disposal, hazardous waste, 25% water, to hazardous waste incineration/CH S	*1,14*	kg	Undefined			"chemical waste"	
Recycling paper/RER U incl benefits and costs	*196,7*	kg	Undefined			Assumed all waste paper to recycling	
Input parameters							
Calculated parameters							

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	11:05:50
Project	Invoices Itella				

Assembly:

Name

paper invoice 1 A4

Materials/Assemblies

Digital printing and enveloping of invoice	*4,9896*	g	Undefined		1 A4-paper
Production of C5 envelopes	*8*	g	Undefined		1 C5-kuvert

Processes

Input parameters

Calculated parameters

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	11:05:27
Project	Invoices Itella				

Life cycle:

Name

Paper invoice system 1 A4

Assembly

paper invoice 1 A4	*1400000000*	p	Undefined		

Processes

Sorting and distributing mail	*13*1400000000*	g	Undefined		8+4,9896 g /invoice
Data capture incl scanning and verification (New)	*1400000000*0,3*0,5*	p	Undefined		50% of all BtoB
Consumer paper invoice handling (New)	*1400000000*0,7*	p	Undefined		B2C, 70% of all invoices
Archive paper invoice	*1400000000*0,3*0,5*	p	Undefined		B2B, 30% of all invoices, and only 1 A4

Waste/Disposal scenario

Paper invoice waste scenario

Additional life cycles

Input parameters

Calculated parameters

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	11:06:41
Project	Invoices Itella				

Life cycle:

Name

Paper invoice system 1 min Internet

Assembly

paper invoice	*1400000000*	p	Undefined		

Processes

Sorting and distributing mail	*18*1400000000*	g	Undefined		8+9,98 g /invoice
Data capture incl scanning and verification (New)	*1400000000*0,3*0,5*	p	Undefined		50% of B2B
Consumer paper invoice handling (1 min)	*1400000000*0,7*	p	Undefined		B2C
Archive paper invoice	*1400000000*0,3*	p	Undefined		B2B

Waste/Disposal scenario

Paper invoice waste scenario

Additional life cycles

Input parameters

Calculated parameters

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	13:31:12	
Project	Invoices Itella					

Life cycle:

Name

Paper invoice system

Assembly

paper invoice	*1400000000*	p	Undefined		

Processes

Sorting and distributing mail	*18*1400000000*	g	Undefined		8+9,98 g /invoice
Data capture incl scanning and verification (New)	*1400000000*0,3*0,5*	p	Undefined		Assumed 50% of B2B
Consumer paper invoice handling (New)	*1400000000*0,7*	p	Undefined		B2C
Archive paper invoice	*1400000000*0,3*	p	Undefined		B2B

Waste/Disposal scenario

Paper invoice waste scenario

Additional life cycles

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-27	Time:	11:04:42
Project	Invoices Itella				

Process

Category type	Waste scenario
Process identifier	Institut14008900044
Type	Unit process
Process name	**Paper invoice waste scenario**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-09-01
Record	Åsa Moberg
Generator	
Literature references	
Collection method	The percentage share of waste management options based on Swedish data for office paper 2006 and the assumption that all envelopes go to incineration. Transportation distances are own assumptions.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Waste scenario						
Paper invoice waste scenario	*1*	kg	All waste types		Others	
Materials/fuels						
Transport, lorry 16-32t, EURO3/RER S	*long_transport *0,001*0,266*900*		tkm	Undefined		paper to recycling
Transport, lorry 16-32t, EURO3/RER S	*(1-long_transport) *0,001*0,266*100*		tkm	Undefined		paper to recycling
Transport, lorry 16-32t, EURO3/RER S	*long_transport *0,001*0,734*100*		tkm	Undefined		paper to incineration
Transport, lorry 16-32t, EURO3/RER S	*(1-long_transport) *0,001*0,734*50*		tkm	Undefined		paper to incineration
Electricity/heat						
Separated waste						
Disposal, paper, 11.2% water, to municipal incineration/CH U (SE efficaincy incl avoided energy)	All waste types	*62*	%			
Disposal, polystyrene, 0.2% water, to municipal incineration/CH U (SE efficiency incl avoided energy)	All waste types	*1*	%			
Recycling paper/RER U incl benefits and costs	All waste types	*37*	%			
Remaining waste						
Unspecified		*100*	%			
Input parameters						
Calculated parameters						

SimaPro 7.1	Product stage	Date:	2008-11-27	Time:	13:32:37
Project	Invoices Itella				

Assembly:

Name

paper invoice

Materials/Assemblies

Digital printing and enveloping of invoice	*4,9896*2*	g	Undefined		2 A4-paper
Production of C5 envelopes	*8*	g	Undefined		1 C5-kuvert

Processes

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-19	Time:	12:31:00
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900015
Type	
Process name	**Phenolformaldehyd NO DATA**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

Phenolformaldehyd NO DATA	*1*	kg	100	not defined	Chemicals\Printing chemicals	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-19	Time:	12:30:29
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900014
Type	
Process name	**Polyvinyl alcohol (pva) NO DATA**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	
Generator	
Literature references	
Collection method	No data available. Thus environmental impact from this substance is missing.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products

Polyvinyl alcohol (pva) NO DATA	*1*	kg	100	not defined	Chemicals\Printing chemicals	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-19	Time:	12:27:24
Project	Invoices Itella				

Process

Category type	Processing
Process identifier	Institut14008900003
Type	Unit process
Process name	**Printing plate**
Status	Finished
Time period	2000-2004
Geography	Europe, Western
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-25
Record	Clara Borggren/Åsa Moberg
Generator	Larsen et al 2006
Literature references	Larsen et al 2006
	The inventory is based on the report by Larsen et al 2006. As the focus of the study is cumulative energy use and greenhouse gas emissions all other emissions are not covered (since all data where not easily understandable in Annex B).
Collection method	
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Printing plate, offset	*4,16*	m2	100	not defined	Printing\ Printing mater	Plates for 1 ton sheet fed offset printed matter in Larsen et al 2006. 0,3 mm thickness, 0,81 kg/m2.
Avoided products						
Aluminium, primary, at plant/RER S	*3,03*	kg	Undefined			Assumed 100%recycling
Resources						
Materials/fuels						
Aluminium, production mix, at plant/RER S	*3,03*	kg	Undefined		Mix of primary adn secondary aluminum assumed to be used for plate production	
2-diazo-1(2H)-naphtalinon-derivate NO DATA	*0,000045*	kg	Undefined		In plate emulsion	
Polyvinyl alcohol (pva) NO DATA	*0,00153*	kg	Undefined		In plate emulsion	
Phenolformaldehyd NO DATA	*0,00288*	kg	Undefined		In plate emulsion "Phenolformaldehydharpiks" in original data	
Water, decarbonised, at plant/RER S	*0,81*	kg	Undefined		In plate developer "Water" in original data	
Na2SiO3 NO DATA	*0,072*	kg	Undefined		In plate developer	
NaOH ETH S	*0,018*	kg	Undefined		In plate developer	
Water, decarbonised, at plant/RER S	*0,0255*	kg	Undefined		In Gumming agent "Water" in original data	
Carboxymethyl cellulose, powder, at plant/RER S	*0,0015*	kg	Undefined		In Gumming agent	
Citric acid NO DATA	*0,0015*	kg	Undefined		In Gumming agent	
Na-dodecyl-diphenyloxid-disulphonate NO DATA	*0,0015*	kg	Undefined		In Gumming agent	
2-methyl-3-isothiazolon NO DATA	*0,00003*	kg	Undefined		Biocide In Gumming agent	
5-chlor-2-methyl-3-isothiazolon NO DATA	*0,0000099*	kg	Undefined		Biocide In Gumming agent	
2-methyl-3-isothiazolon NO DATA	*0,000313*	kg	Undefined		In biocide	
5-chlor-2-methyl-3-isothiazolon NO DATA	*0,000938*	kg	Undefined		In biocide	
Tap water, at user/RER S	*37,42*	kg	Undefined		for rinsing	
Aluminium, secondary, from old scrap, at plant/RER S	*3,03*	kg	Undefined		This is the waste management of aluminum. Assumed 100% recycling. (In Larsen et al 3,44, but this is more than the input)	
Electricity/heat						

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Disposal, hazardous waste, 25% water, to hazardous waste incineration/CH S	*0,544*	kg	Undefined		Plate developer
Treatment, sewage, to wastewater treatment, class 1/CH S	*0,00039*	m3	Undefined		0,39329 kg. No ww-treatment specific for this process available

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-14	Time:	14:25:23
Project	Invoices Itella				

Process

Category type	Material
Process identifier	Institut14008900038
Type	Unit process
Process name	**Production of C5 envelopes**
Status	Finished
Time period	2005-2009
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-28
Record	Åsa Moberg
Generator	
Literature references	
Collection method	Personal Communication with Magnus Olofsson and Thomas Thomasson at Bong Ljungdahl, May - September 2008.
Data treatment	
Verification	
Comment	
Allocation rules	
System description	

Products						
Production of C5 envelopes	*8*	kg	100	not defined	Media	116*229 mm H2 placed standard window, 1000 p envelopes
Avoided products						
Resources						
Materials/fuels						
Paper, woodfree, uncoated, at integrated mill/RER U (Electricity mix)	*7,98*	kg	Undefined			7,98 kg of 90 g/m2 paper (Multimail paper)
Polystyrene, general purpose, GPPS, at plant/RER S	*0,23*	kg	Undefined			for envelope window
Glue, no impact NO DATA	*0,17*	kg	Undefined			different kinds of glue
Water based ink, no impact NO DATA	*0,24*	kg	Undefined			
Transport, lorry 16-32t, EURO3/RER S	*long_transport*7,2*	tkm	Undefined			Assumption 900 km
Transport, lorry 16-32t, EURO3/RER S	*(1-long_transport)*0,8*	tkm	Undefined			Assumption 100 km
Electricity/heat						
Electricity mix "CO2-cap" at grid	*CO2cap_el*0,0034*	kWh	Undefined			
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*0,0034*	kWh	Undefined			
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						

Waste to treatment					
Recycling paper/RER U incl benefits and costs	*7,98-7,98/1,08*	kg	Undefined		All paper waste to recycling
Disposal, polystyrene, 0.2% water, to municipal incineration/CH U (SE efficiency incl avoided energy)	*0,23-0,23/1,08*	kg	Undefined		

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date:	2008-11-14	Time:	12:45:40
Project	Invoices Itella				

Process

Category type	Processing
Process identifier	Institut14008900025
Type	Unit process
Process name	**Sorting and distributing mail**
Status	Finished
Time period	2000-2004
Geography	Europe, Western
Technology	Average technology
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	Åsa Moberg
Generator	Posten AB
Literature references	
Collection method	Literature: Miljövarudeklarationer (Environmental Product Declaration) from Posten AB describing Economy letter and First class letter repsectively
Data treatment	
Verification	
Comment	Underlying data for the EPDs have been provided by Charlotta Szczepanowski at Posten AB
Allocation rules	
System description	

Products						
Sorting and distributing mail	*1*	g	100	not defined	Others	
Avoided products						
Resources						
Materials/fuels						
Transport, van <3.5t PETROL ONLY /RER U	*0,00005*	tkm	Undefined		Same for economic or 1st class letter	
Transport, lorry 3.5-16t, fleet average/RER S	*Economy_letter*4,3E-4*	tkm	Undefined		All invoices with economy distribution	
Transport, lorry 3.5-16t, fleet average/RER S	*0,7*(1-Economy_letter)*4,3E-4*	tkm	Undefined		BtoC is always Economy, 70% of all invoices	
Transport, lorry 3.5-16t, fleet average/RER S	*0,3*(1-Economy_letter)*4,1E-4*	tkm	Undefined		Only for BtoB, 30% of all incoices	
Transport, aircraft, freight, Europe/ RER S	*0,3*(1-Economy_letter)*1,6E-4*	tkm	Undefined		Only for BtoB, 30% of all incoices	
Electricity/heat						
Electricity mix "CO2-cap" at grid	*CO2cap_el*0,3*	Wh	Undefined		Same for economic or 1st class letter	
Electricity mix "high gas price" at grid	*(1-CO2cap_el)*0,3*	Wh	Undefined		Same for economic or 1st class letter	
Emissions to air						
Emissions to water						
Emissions to soil						
Final waste flows						
Non material emissions						
Social issues						
Economic issues						

Waste to treatment					
Disposal, hazardous waste, 25% water, to hazardous waste incineration/CH S	*0,03*	mg	Undefined		

Input parameters

Calculated parameters

SimaPro 7.1	Process	Date: 2008-11-14	Time: 15:58:56
Project	Invoices Itella		

Process

Category type	Material
Process identifier	Institut14008900028
Type	Unit process
Process name	**Water based ink, no impact NO DATA**
Status	Finished
Time period	Unspecified
Geography	Unspecified
Technology	Unspecified
Representativeness	Unspecified
Multiple output allocation	Unspecified
Substitution allocation	Unspecified
Cut off rules	Unspecified
Capital goods	Unspecified
Boundary with nature	Unspecified
Infrastructure	No
Date	2008-08-26
Record	Clara Borggren/Åsa Moberg
Generator	
Literature references	
Collection method	
Data treatment	
Verification	
Comment	No impact - lack of data for water based ink
Allocation rules	
System description	

Products

Water based ink, no impact NO DATA	1	kg	100	not defined	Chemicals\Others	

Avoided products

Resources

Materials/fuels

Electricity/heat

Emissions to air

Emissions to water

Emissions to soil

Final waste flows

Non material emissions

Social issues

Economic issues

Waste to treatment

Input parameters

Calculated parameters