CPM Rapport 2001:16

Slutrapport projekt II:F:11
Databasuppbyggnad

Sammanställd av projektledare
Ann-Christin Pålsson

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Sammanfattning

Statistik:
- Antal data som kommit in under etappen: 517
- Antal data i den granskade databasen SPINE@CPM: 446 (ökat med 272 under etappen)
- Antal data i den ogranskade databasen SPINE@by-pass: 271

Data har försålts utanför CPM för en administrativ kostnad. Utbildningskurser avseende datadokumentation har hållits. Andra datainhämtningsprojekt har genomförts.

Förslag till fortsättningar presenteras.

1 Projektet och delprojekt

Slutrapporten inkluderar följande projekt:
- II:F:4 Databasuppbyggnad och samordning av datainsamling (projekttid: 980301-991131)
- II:F:6 Databasuppbyggnad via 5 LCI-datamängder per företag (projekttid: 980301-991131)
- II:F:11 Databasuppbyggnad (projekttid: 991201-010831)

1.1 Databasuppbyggnad

1.1.1 LCI-data:

Statistik:
- Antal data som kommit in under etappen: 531 st
- Antal data i den granskade databasen SPINE@CPM: 446 (ökat med 260 under etappen). 7 av dessa är transparenta LCI flödesscheman, dvs var och en av de ingående processerna är dokumenterade och publicerade i databasen.
- Antal data i den ogranskade databasen SPINE@by-pass: 271

Datainsamling till databasen sker genom:
- *Åtagande CPM företag:*
  Grundprincipen för databasuppbyggnad är att varje CPM företag lämnar 5 LCI-datamängder per företag och år till databasen.
  Avvikelse: Skogsföretagen skulle lämna STFis databas, men har istället valt att gemensamt köra CPM/SSVL-projektet. Dessutom är Cementa exkluderad från principen.
- *Specifika dataprojekt:*
  Specifika projekt för att tillgängliggöra särskilt efterfrågad data. Exempel är aluminium data, uppdateringar av transportdata, och generella elproduktionsdata för EPD (se nedan). Ett datainköp från SIK har också genomförts.
- *Datautbytesavtal:*
  Examensarbetare erbjuds tillgång till data i databasen mot att ny data lämnas in och publiceras i databasen.

Flera företag lämnat in och publicerat flera data utöver de som krävs. Dessutom har ABB valt att lämna in en stor mängd data som inte fullt uppnår

dokumentationskraven, men som istället publiceras separat som databasen SPINE@by-pass.

Totalt 24 personer har medverkat med data till den granskade databasen SPINE@CPM (se Appendix A). En sammanställning över alla publicerade LCI-datamängder i SPINE@CPM återfinns i Appendix B.

Referenser:
SPINE@CPM:

- http://deville.cpm.chalmers.se/spineatcpm
- http://deville.cpm.chalmers.se/commdb

SPINE@by-pass:

- Säljs genom CIT, Nordic Port, samt Assess Eco Strategy Scandinavia som förstärkning till deras mjukvaror.

1.1.2 Miljöpåverkansdata

Under år 2000 genomfördes ett examensarbete, med uppgift att mata in miljöpåverkansdata för tre olika miljöpåverkansbedömningsmetoder (EPS 2000, EDIP, och EcoIndicator 99). Detta arbete fortsatte under år 2001, genom att dokumentation och t.ex. storheter och enheter blev konsistenta inom metoderna.

Referens:

- http://www.globalspine.org

1.1.3 Aluminiumdata

Som en sidoeffekt ur ISO-standardiseringsarbetet ombads CPM att tillsammans med European Aluminium Association (EAA) översätta Europeisk aluminiumdata till först SPINE-format, sedan ISO 14048-format. Inom projektet har data översatts till SPINE-format, och arbetet har gjorts i nära samarbete med EAA.

Referenser:

- Formatting Data from the Environmental Profile Report for the European Aluminium Industry to the Data Documentation Format SPINE, according to the CPM Data Documentation Criteria, Maria Erixon, CPM, Chalmers University of Technology, 2001-09-04

1.1.4 Generella data för elproduktion, avsedda för EPD

På uppdrag av Miljöstyrningsrådets tekniska kommitté har Vattenfall tagit fram generella livscykelanalysdata för elproduktion med olika kraftslag och generella elmixer för olika länder. Syftet med datamängderna är att dessa skall användas när specifika data för elproduktion saknas vid utförande av en LCA till underlag för tredjepartscertifierade miljövarudeklarationer (EPD).

Data för elproduktion med olika kraftslag baseras på en europeisk studie utförd vid ETH i Schweiz. Denna studie har vid arbetet anpassats till det svenska EPD systemet avseende bland annat parameterval. För att säkerställa att den ursprungliga studien har tolkats och bearbetats på rätt sätt har dokumentationen även granskats av Rolf Frischknecht, ESU-services, en av de ansvariga för den ursprungliga studien.

1.1.5 Modeller för tillverkning av elektronikkomponenter

En första ansats till hur elektronik produktion kan inkluderas i LCA gjordes på Ericsson inom ramen för ett LCA projekt för en telefonväxel. I projektet utvecklades

modeller beskrivande produktion av 16 komponentgrupper. Grupperingen av komponenterna baserades på strukturell likhet, elektrisk funktion, material innehåll och datatillgång.

1.1.6 Uppdatering av data för godstransporter från NTM

En första version av data för olika typer av godstransporter framtagna inom NTM (nätverket för transporter och miljön) bearbetades enligt CPMs dokumentationskrav och publicerades i SPINE@CPM under etapp I. Under 1999 tog NTM fram och publicerade en uppdaterad version, och för att tillgängliggöra även denna i SPINE@CPM fick Magnus Blinge på transportteknik Chalmers i uppdrag att bearbeta och dokumentera denna uppdaterade version.

1.2 Datahandel

Enligt styrelsebeslut öppnades 1998 databasen SPINE@CPM för allmänheten genom att en administrativ avgift togs ut för varje levererad datamängd. För att ge rättvisa åt att vissa data var bättre dokumenterade än andra, beror den administrativa avgiften av hur väl data är dokumenterad.

Följande prismodell gäller (kopierad från webplatsen):

Degree of documentation	Separate data set Price (SEK)	Aggregated data set Price (SEK)
Sufficient	1000,00	500,00
Acceptable	600,00	300,00
Unsatisfying	250,00	125,00

Dessutom tas olika avgifter ut beroende på huruvida beställaren vill ha data på CD-skiva, i pappersformat, i olika databasformat etc.

Referens:

- Carlson R., Pålsson A-C, Erixon M. "Etablering av handelsstrukturer för LCI-data, En rapport som beskriver CPM:s strategi för utveckling av LCI-datahandel", CPM-rapport 2000:3

1.2.1 Almi Dalarna

CPM deltog med data i ett av Almi stöttat projekt med avsikt att lära små- och medelstora företag att göra miljövarudeklarationer, och fick därigenom en utvärderingsrapport avseende t.ex. databasens tillämplighet i projektet.

Referenser:

- ”Rapport, Utvärdering av arbete med SPINE@CPM database, Almi företagspartner Dalarna AB”, Sammanställd 20:e April 2001 av Elisabeth Bröms
- Kvantitativ sammanställning av datahandel finns i Appendix C.

1.3 Manualer

Inom projektet har manualer för dokumentation och granskning färdigställts, baserade på metodik utvecklad under CPMs första etapp. Dessa används vid t.ex. utbildning och handledning.

Under vintern 1998/1999 bidrog dataverksamheten med erfarenheter avseende granskning i ett projekt med syfte att utveckla en manual för granskning av LCA inom det svenska EPD systemet. Projektet finansierades av avfallsforskningsrådet. I projektet utvecklades granskningsrutiner och rapporteringskrav för LCA studier som ligger till grund för miljövarudeklarationer, till stor del baserade på CPMs dokumentations- och granskningsmetodik. Resultatet från projektet har infogats i bestämmelserna för certifierade miljövarudeklarationer, EPD (MSR 1999:2)

Referenser:

- Pålsson A-C; "Introduction and guide to LCA data documentation using the CPM data documentation criteria and the SPINE format"; CPM report 1:1999
- Pålsson A-C.; "Review of LCI-data at SPINE@CPM"; CPM Internal Report 1999
- Eriksson E., Lindfors L-G., Pålsson A-C., Ribbenhed M.; "Manual för granskning av livscykelanalyser - med applikation på EPD"; AFR-rapport 248; 1999; Naturvårdsverket

1.4 Kurser

Under etapp I av CPM lärdes datadokumentation enligt CPMs kvalitetskrav först ut genom att besök gjordes på vart och ett av företagen. Sedan utvecklades denna utbildning till handledningsmöten på Chalmers, för att sedan utvecklas till fem-, resp tredagarskurser, med både praktik och teori.

Flera personer både inom Chalmers och från andra organisationer har bidragit under kursdagarna, såsom Tomas Rydberg och Elisabeth Andersson vid Volvo, Jessica Granath vid IVL, Britta Nilsson vid SIK, Klas Hallberg vid Akzo Nobel, Ola Svending vid Stora Enso och Göran Brohammer vid IVF.

Referens:

- Slutrapportering av CPM etapp II SPINE-kursverksamhet, sammanställd av Maria Erixon 2001-09-25 (obs, sprids endast internt inom CPM)

2 Slutsatser

- Datainsamlingen, inkluderande dokumentation, granskning och publicering har under etapp II utvecklats till praktiskt fungerande operativ verksamhet. Data dokumenterad enligt CPM:s kvalitetskrav går återanvända vid nya studier, genom att tillämplighet av data kan utläsas ur datas dokumentation.
- Kvaliteten och läsbarheten i datadokumentationen har blivit allt bättre i takt med att personer har utbildats i CPMs kurser.
- Fortfarande finns nivåskillnad mellan företagens interna dokumentation och den dokumentation som krävs för att göra en gemensam, öppen databas användbar. Orsakerna till denna nivåskillnad inte tillräckligt väl förklarad för nya användare, dvs att graden av dokumentation är helt avhängig graden av kompetens och organisatorisk tillhörighet hos datalämnare och –användare.
- Databasuppbyggnaden kan under denna etapp sägas ha varit framgångsrik, men databasen fyller ändå inte företagens behov av data. Med den metodik-bas som byggdes under CPMs första etapp, och som etablerats väl under andra etappen, kan databasuppbyggnad göras mer effektiv och avnämaranpassad.

3 Rekommenderad och planerad fortsättning

Kurser och handledning bör fortsätta som tidigare, men med ny förstärkt inriktning mot också ISO /TS 14048 (se även slutrapportering II:F:13).

Forskning bör göras, vad avser datadokumentationskriterierna, dels för att bättre förstå varför dessa fungerar, samt hur dessa kan fås att fungera än mer effektivt. Särskilt bör denna forskning inrikta sig mot organisatorisk kvalitetskontroll och dess kopplingar till språk och dokumentation.

Särskilt bör poängteras behovet av avnämaranpassad databasuppbyggnad, dvs databasprojekt där en eller flera organisationer tydligt specificerar sina behov av data (t.ex. cradle to gate eller gate to grave) för olika produkter, med olika förutsättningar etc. Här är det lämpligt med projekt på sektoriell, nationell, eller internationell nivå. För närvarande försöker vi påverka utformningen av UNEP/SETAC Life Cycle Initiative's Life Cycle Inventory Program's planering i denna riktning.

Appendix A. Personer som medverkat med data

ABB – 276 publicerade aktiviteter

- Gunnar Mattson, ABB Corporate Research
- Anne-Marie Imrell, ABB Corporate Research

OBS: 5 aktiviteter har publicerats i den granskade databasen SPINE@CPM och 271 datamängder i den ogranskade databasen SPINE@by-pass.

Akzo Nobel AB – 20 publicerade aktiviteter

- Adeline Ries, examensarbetare Akzo Nobel Surface Chemistry
- Malin Ericson, Akzo Nobel Surface Chemistry
- Klas Hallberg, Akzo Nobel Surface Chemistry
- Birgit Nilsson, Casco Products

Electrolux - 8 publicerade aktiviteter

- Sofia Medin, Electrolux ESD

Ericsson - 18 publicerade aktiviteter

- Anders Andrae, Ericsson Business Network

Vattenfall AB – 66 publicerade aktiviteter

- Maria Münter, SwedPower, Vattenfall AB
- Emanuel Nandorf, SwedPower, Vattenfall AB
- Pernilla Strömberg, SwedPower, Vattenfall AB
- Andrea Wallenius, SwedPower, Vattenfall AB
- Birgitta Olanders, SwedPower, Vattenfall AB
- Caroline Setterwall, Swedpower, Vattenfall AB

Volvo - 12 publicerade aktiviteter

- Dan Wahlström, Volvo Teknisk Utveckling
- Caroline Sjöberg, Volvo Teknisk Utveckling

Chalmers – 83 publicerade aktiviteter

- Ann-Christin Pålsson, CPM
- Magnus Blinge, Transportteknik
- Maria Erixon, CPM
- Sara Ågren, projektanställd Teknisk miljöplanering

Examensarbetare på Chalmers – 25 publicerade aktiviteter

- Daniel Strandberg
- Christer Wik
- Åsa Ekdahl

SIK – 23 publicerade aktiviteter

- Jennifer Davis, SIK –23 activities

Appendix B. Sammanställning över aktiviteter publicerade i SPINE@CPM

Data acquired in: Database build-up

Data on production of polymer materials, acquired from APME eco-balance reports – 7 activities

Data documented by: Gunnar Mattson, ABB Corporate Research
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2001 10 29

Extraction to ABS APME *(Replaces a data set published 1999)*
Extraction to polyethylene HD APME
Extraction to polyethylene LD APME
Extraction to polyethylene linear LD APME
Extraction to SAN APME *(Replaces a data set published 1999)*
Extraction to toluene APME *(Replaces a data set published 2001 01 26)*
Extraction to xylene APME

Data acquired in: Data exchange agreements

Data on board and SKF products acquired within a M Sc. thesis performed at Chalmers – 7 activities

Data documented by: Åsa Ekdahl, M. Sc thesis student at dept. of Environmental Systems Analysis, Chalmers University of Technology
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2001 09 05

Manufacturing of Hot Rolled Square Billets, 150 mm
Manufacturing of SKF's Spherical Roller Bearing
Production of a Corrugated Board Box (182*62*182)
Production of Bearing Steel
Production of Iron Powder
Production of Kraftliner
Production of Semichemical Fluting

Data acquired in: Database build-up

Data on production of polymer materials and chemicals, acquired from APME eco-balance reports and production of cooling fluid acquired from an IVF report – 11 activities

Data documented by: Caroline Sjöberg and Sofia Haargaard, Volvo Technological Development
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2001 09 05

Production of benzene (APME)
Production of cooling fluid, R134a
Production of polyamid 66 containing 30% glass fibre (APME)
Production of polyethylene terephthalate (APME)
Production of polymethyl methacrylate (APME)

Production of polypropylene (APME)
Production of polystyrene (APME)
Production of polyvinyl chloride, emulsion polymerised (APME)
Production of polyvinyl chloride, suspension polymerised (APME)
Production of styrene (APME)
Production of toluene diisocyanate (APME)

Data on different types of adhesives and hardeners produced by Casco Products - 10 activities

Data documented by: Birgit Nilsson, Casco Products
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2001 08 07

Production of Dowel Adhesive PVAC 3370
Production of Hardener 2545 for urea formaldehyde resins
Production of Hardener 2580 for urea formaldehyde resins
Production of Urea-formaldehyde resin 1202 (UF 1202), Wood Adhesive
Production of Urea-formaldehyde resin 1205 (UF 1205), Wood Adhesive
Production of Urea-formaldehyde resin 1206 (UF 1206), Wood Adhesive *(updated version of the dataset published 2001 02 02)*
Production of Urea-formaldehyde resin 1274 (UF 1274), Wood Adhesive
Production of wood Adhesive PVAC 3316
Production of wood Adhesive PVAC 3318
Production of wood Adhesive PVAC 3326

Data on electricity production based on Frischknecht R. et al "Environmental Life-Cycle Inventories of Energy Systems" - 6 activities

Data documented by: Caroline Setterwall, Swedpower, Vattenfall AB
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology and Rolf Frischknecht, ESU Services
Published: 2001 04 11

Fuel gas electricity energy system, ETH - full version
Hydro electricity energy system, ETH - full version
Lignite electricity energy system, ETH - full version
Nuclear electricity energy system, ETH - full version
Oil electricity energy system, ETH - full version
Stone coal electricity energy system, ETH - full version

Data on the electricity generation mix for different countries intended for use in the Swedish system for Environmental Product Declarations (EPD), based on IEA statistics - 34 activities

Data documented by: Caroline Setterwall, Swedpower, Vattenfall AB
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2001 04 04

Australia, electricity generation mix 1998
Austria, electricity generation mix 1998
Belgium, electricity generation mix 1998
Canada, electricity generation mix 1998
Czech Republic, electricity generation mix 1998

Denmark, electricity generation mix 1998
European Union, electricity generation mix 1998
Finland, electricity generation mix 1998
France, electricity generation mix 1998
Germany, electricity generation mix 1998
Greece, electricity generation mix 1998
Hungary, electricity generation mix 1998
Iceland, electricity generation mix 1998
Ireland, electricity generation mix 1998
Italy, electricity generation mix 1998
Japan, electricity generation mix 1998
Korea, electricity generation mix 1998
Luxembourg, electricity generation mix 1998
Mexico, electricity generation mix 1998
Netherlands, electricity generation mix 1998
New Zealand, electricity generation mix 1998
Norway, electricity generation mix 1998
OECD Europe, electricity generation mix 1998
OECD North America, electricity generation mix 1998
OECD Pacific, electricity generation mix 1998
OECD total, electricity generation mix 1998
Poland, electricity generation mix 1998
Portugal, electricity generation mix 1998
Spain, electricity generation mix 1998
Sweden, electricity generation mix 1998
Switzerland, electricity generation mix 1998
Turkey, electricity generation mix 1998
United Kingdom, electricity generation mix 1998
United States, electricity generation mix 1998

Data on asphalt pavement; production of hot mix and adhesion promoter from a Master of Science thesis performed at Akzo Nobel Surface Chemistry - 2 activities

Data documented by: Adeline Ries, thesis worker at Akzo Nobel Surface Chemistry
Internal review by: Klas Hallberg, Akzo Nobel Surface Chemistry
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2001 03 05

Production of hot mix for asphalt pavement
Production of Wetfix I (adhesion promoter used in hot mix for asphalt pavements)

Data on electricity production adapted for use in the Swedish system for Environmental Product Declarations (EPD), based on Frischknecht R. et al "Environmental Life-Cycle Inventories of Energy Systems" - 8 activities

Data documented by: Caroline Setterwall, Swedpower, Vattenfall AB
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology and Rolf Frischknecht, ESU Services (except Biofuel electricity energy system, EPD-version)
Published: 2001 02 19

Biofuel electricity energy system, EPD-version
Fuel gas electricity energy system, EPD-version
Hydro electricity energy system, EPD-version
Lignite electricity energy system, EPD-version

Nuclear electricity energy system, EPD-version
Oil electricity energy system, EPD-version
Stone coal electricity energy system, EPD-version
Wind electricity energy system, EPD-version

Data on production of wood-adhesive from an environmental product declaration – 1 activity

Data documented by: Birgit Nilsson, Casco Products
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2001 02 02

Production of Urea-formaldehyde resin 1206 (UF 1206), Wood Adhesive

NOTE: This activity has been updated. The new version was published 7 August 2001.

Data on production of polymer materials and chemicals, acquired from APME eco-balance reports – 1 activity

Data documented by: Gunnar Mattson, ABB Corporate Research
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2001 01 26

Extraction to toluene

Note: The documentation of this data set were supplemented to be consistent with the other data sets from APME eco-balance reports. The new, supplemented version were published 29 October 2001.

Data describing heat producing plants using different fuels, compiled at Swedpower – 18 activities

Data documented by: Maria Münter, Emanuel Nandorf, Pernilla Strömberg, Andrea Wallenius, Birgitta Olanders at SwedPower AB
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2000 06 29

Dry wood chips fired plant for heat and power production - Large plant
Natural gas fired combination plant for heat and power production
Natural gas fired plant for heat production - Small plant
Natural gas fired plant with flue gas condensation for heat and power production
Propane fired combination plant for heat and power production
Propane fired plant for heat production - Large plant
Propane fired plant for heat production - Small plant
Pulverized wood fired plant for heat and power production - Large plant
Pulverized wood fired plant for heat production - Small plant
Wood chips fired plant (with stoker) for heat and power production – Large plant
Wood chips fired plant (with stoker) for heat production - Small plant
Wood fired CFB plant for heat and power production - Large plant
Wood fired CFB plant for heat production - Small plant
Wood pellets fired plant for heat and power production - Large plant
Wood pellets fired plant for heat production - Small plant

Published 2000 08 14

Coal fired plant for heat and power production
Peat fired plant for heat and power production
Waste to energy plant

Cradle to gate data describing stages in copper production, acquired from a report made by the International Copper Association – 6 activities

Data documented by: Sofia Medin, Electrolux ESD
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2000 06 27

Copper ore concentrate preparation and delivery
Copper ore mining
Production of blister copper
Production of copper anodes
Production of matte copper
Production of primary copper

LCI-models for 16 electronic component groups, compiled at Ericsson – 18 activities

Data documented by: Anders Andrae, Ericsson Business Network
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2000 06 27

"Other" electronic components assembly
Cable assembly
Capacitor for hole mounting assembly
Capacitor for surface mounting assembly
Connector assembly
Diode wafer production and assembly
Inductor assembly
Integrated circuit capsule assembly
Liquid crystal display unit assembly
Potentiometer assembly
Printed board assembly
Relay assembly
Resistor for hole mounting assembly
Resistor for surface mounting assembly.
Resistor network assembly
Si wafer production and Si wafer processing for integrated circuits
Si wafer production and Si wafer processing for transistors
Transistor assembly

Data acquired in: Update of NTM data on freight transportation

Data on freight transports from material compiled within NTM (Network for Transports and Environment)- 38 activities

Data documented by: Magnus Blinge, Dept. Transportation and logistics, Chalmers University of Technology
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2000 03 02

Truck transportation

Delivery van, distribution, diesel
Delivery van, distribution, petrol
Heavy truck with one trailer, long distance, Euro 0
Heavy truck with one trailer, long distance, Euro 1

Heavy truck with one trailer, long distance, Euro 2
Heavy truck with one trailer, long distance, made before 1990
Heavy truck with two trailers, long distance, Euro 0
Heavy truck with two trailers, long distance, Euro 1
Heavy truck with two trailers, long distance, Euro 2
Heavy truck with two trailers, long distance, made before 1990
Light truck, distribution, Euro 0
Light truck, distribution, Euro 1
Light truck, distribution, Euro 2
Light truck, distribution, made before 1990
Medium weight truck, regional, Euro 0
Medium weight truck, regional, Euro 1
Medium weight truck, regional, Euro 2
Medium weight truck, regional, made before 1990

Boat transport

Cargo vessels, large (>8´ dwt)
Cargo vessel, medium-sized (8´-2´ dwt)
Cargo vessel, small (<2´dwt)
Ferry
Roll-on-roll-off vessel (RoRo)

Air transportation

Published 000303

Jet plane, A 300-B4, 1200 km
Jet plane, A 300-B4, 600 km
Jet plane, B727-200, 1200 km
Jet plane, B727-200, 600 km
Jet plane, B737-300QC, 1200 km
Jet plane, B737-300QC, 600 km
Jet plane, B747-400, 1200 km
Jet plane, B747-400, 600 km

Rail transportation

Diesel propulsed train.
Electrically driven intermodal train, RC engine, including electricity production
Electrically driven Intermodal train, RC engine
Electric freight train, waggon load, including electricity production
Electric freight train, waggon load
Electrically driven system train (Circuit-working), RC engine
Electrically driven system train (Circuit-working), RC engine, including electricity production

Data acquired in: Data purchase from SIK

Data on production of fertilisers, acquired in thesis project performed at SIK – 23 activities

Data documented by: Jennifer Davis, SIK
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2000 02 22

Extraction and beneficiation of rock phosphate

Extraction and grinding of dolomite
Extraction of dolomite
Extraction of sulphur and production of sulphuric acid
Extraction, beneficiation and grinding of kieserite
Extraction, beneficiation and grinding of potash salt
Grinding of dolomite
Production of ammonia
Production of ammonium nitrate
Production of CAN fertiliser
Production of CAN fertiliser *(Aggregated)*
Production of nitric acid
Production of nitric acid (Landskrona)
Production of NP 27-5 fertiliser
Production of NP 27-5 fertiliser *(Aggregated)*
Production of NPK 20-3-5 fertiliser
Production of NPK 20-3-5 fertiliser *(Aggregated)*
Production of phosphoric acid
Production of phosphoric acid (48 % P2O5)
Production of sulphuric acid by roasting of pyrite
Production of TSP fertiliser
Production of TSP fertiliser *(Aggregated)*
Storage of ammonia

Data acquired in: Database build-up

Data on painting process – 1 activity

Data documented by: Dan Wahlström, Volvo Technological Development
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published: 2000 02 16

Inventory of Volvo painting plant, TB4

Data on production of polymer materials and chemicals, acquired from APME eco-balance reports – 4 activities

Data documented by: Gunnar Mattson, ABB Corporate Research
Documentation reviewed by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Published 2000 02 22

Extraction to polycarbonate APME
Extraction to polyethylene all grades APME

Published: 2000 01 27

Mining to sodium chloride APME
Mining to sodium hydroxide APME

Data acquired in: Internal work at CPM

Study on Swedish average electricity production – 1 activity

Data documented by: Maria Erixon at CPM, Chalmers University of Technology
Documentation reviewed by: -
Published 2000 09

Swedish average electricity production *Composite system*

Compilation of production system for softwood, using activities published in SPINE@CPM – 1 activity

Data documented by: Ann-Christin Pålsson, CPM, Chalmers University of Technology
Documentation reviewed by: -
Published 2000 10

Silviculture of softwood *Composite system*

Data acquired in: Thesis projects at Technical Environmental Planning

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LCA-study on converted fuel oil – 18 activities

Data documented by: Daniel Strandberg and Christer Wik, MSc students at Chalmers University of Technology
Documentation reviewed by: Ann-Christin Pålsson, Chalmers University of Technology
Published 1999 12

Converting waste-oil into fuel oil *Composite system*
Combustion of waste
De-watering of water-sludge
Vessel Loudden to Halmstad
Truck Jönköping to Halmstad
Freight-Train Luleå to Halmstad
Freight-Train Umeå to Halmstad
Processing of waste-oil into fuel oil
Treatment of waste oil from industries and municipalities
Treatment of oil-contaminated waste water
Vessel Göteborg to Halmstad
Truck Reci Göteborg to Sävenäs
Vessel Halmstad to Slite
Truck Halmstad to Göteborg (Water-sludge)
Truck Halmstad to SAKAB
Truck Halmstad to Göteborg (Scrap)
Truck Göteborg to SAKAB
Treatment of hazardous waste

Data acquired in: Industrial data acquisition

Data on production of polymer materials – 2 activities

Data documented by: Sofia Medin, Electrolux Research and Innovation AB
Documentation reviewed by: Ann-Christin Pålsson, Chalmers University of Technology
Published 1999 09

Production of ABS co-polymer granules
Production of SAN co-polymer granules

Note: These data sets were replaced 29 October 2001, by "Extraction to ABS APME" and "Extraction to SAN APME". The documentation have been further supplemented to be consistent with the other data sets acquired from the APME ecobalance reports.

Data on production of surfactants and ethanol– 8 activities

Data documented by: Malin Ericson, AkzoNobel Surface Chemistry
Documentation reviewed by: Ann-Christin Pålsson, Chalmers University of Technology

Published 1999 04

Production of petrochemical Alcohol Ethoxylates (AE) with 7 moles of ethylene oxide (EO)
Production of Soap from palm oil/palm kernel oil
Production of Linear Alkylbenzene Sulphonates (LAS)
Production of Alkyl Polyglucosides (APG) from coconut oil
Production of petrochemical Alcohol Sulphates (AS)
Production of petrochemical Alcohol Ethoxylates (AE) with 3 moles of ethylene oxide (EO)
Production of Wine Ethanol Fuel (ETAMAX D), including grape cultiv. and wine prod.
Production of Wine Ethanol Fuel (ETAMAX D), excluding grape cultiv. and wine prod.

Data acquired in: Project to document exercise material in SPINE for LCA-course at Technical Environmental Planning

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Data on different types of activities, intended to be used in LCA exercises – 43 activities

Data documented by: Maria Erixson and Sara Ågren, project employed at Technical Environmental Planning, Chalmers University of Technology
Published 1998 10

Cleansing of glass containers
Cleansing of juice bottles
Combustion of bio fuel
Combustion of coal
Combustion of natural gas
Combustion of oil
Crushing and cleaning of broken glass
Extraction of crude oil
Extraction of dolomite
Extraction of feldspar
Extraction of lime
Extraction of Portland soda
Extraction of sand
Glassworks
Incineration of aluminium
Incineration of corrugated board
Incineration of linoleum
Incineration of paperboard for liquids
Incineration of polyethylene
Incineration of polystyrene
Incineration of PVC
Incineration of starch
Incineration of wood
Landfill disposal
Laying of linoleum-floor
Production of high-density polyethylene
Production of injection moulding
Production of iron oxide
Production of linoleum
Production of linseed oil
Production of linseed oil in Sweden

Production of low-density polyethylene
Production of PE-film
Production of powdered limestone
Production of powdered wood
Production of sodium sulphate
Production of Solvey soda
Production of titanium dioxid
Production of washing soda
Recycling of polyethene
Refining of crude oil
Steam cracking of refined oil products

Data acquired in: Relations to organisations and networks outside the CPM group

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Data on freight transports from material compiled within NGM (Network for Freight Transports and Environment) - 59 activities

Road Transports - 26 activities

Data documented by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Documentation reviewed by: Michael Björkman, BTL (Bilspedition Transportation and Logistics), contact person for road transports in the work of NGM
Published 1998 02

Heavy truck with trailer, max 60 tonnes, future
Heavy truck with trailer, max 60 tonnes, manufactured after 1996
Heavy truck with trailer, max 60 tonnes, manufactured before 1992
Heavy truck with trailer, max 60 tonnes, manufactured between 1992 and 1995
Truck with semitrailer, max 42 tonnes, future
Truck with semitrailer, max 42 tonnes, manufactured after 1996
Truck with semitrailer, max 42 tonnes, manufactured before 1992
Truck with semitrailer, max 42 tonnes, manufactured between 1992 and 1995
Heavy truck with international semitrailer, max 40 tonnes, future
Heavy truck with international semitrailer, max 40 tonnes, manufactured after 1996
Heavy truck with international semitrailer, max 40 tonnes, manufactured before 1992
Heavy truck with international semitrailer, max 40 tonnes, manufactured between 1992 and 1995
Heavy truck, max 24 tonnes, future
Heavy truck, max 24 tonnes, manufactured after 1996
Heavy truck, max 24 tonnes, manufactured before 1992
Heavy truck, max 24 tonnes, manufactured between 1992 and 1995
Heavy truck, max 18 tonnes, future
Heavy truck, max 18 tonnes, manufactured after 1996
Heavy truck, max 18 tonnes, manufactured before 1992
Heavy truck, max 18 tonnes, manufactured between 1992 and 1995
Light truck, max 8 tonnes, future
Light truck, max 8 tonnes, manufactured after 1996
Light truck, max 8 tonnes, manufactured before 1992
Light truck, max 8 tonnes, manufactured between 1992 and 1995
Light truck, max 3,5 tonnes, diesel driven

Light truck, max 3,5 tonnes, gasoline driven

Rail transports - 10 activities

Data documented by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Documentation reviewed by: Ingela Melkersson, SJ Stab Information, contact person for rail transports in the work of NGM
Published: 1998 02

Diesel driven freight train, future
Diesel driven freight train, T44 engine
Electrically driven combi train, future
Electrically driven combi train, RC engine
Electrically driven freight train 230 metres, future
Electrically driven freight train 230 metres, RC engine
Electrically driven freight train 700 metres, future
Electrically driven freight train 700 metres, RC engine
Electrically driven system train, future
Electrically driven system train, RC engine

Sea transports - 10 activities

Data documented by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Documentation reviewed by: Elisabeth Sörheim, Swedish Shipowners' Association, contact person for sea transports in the work of NGM
Published: 1998 02

Ferry, 700-7000 tonnes
Ferry, 700-7000 tonnes, future
Freighter, 2000-8000 dwt
Freighter, 8000-2000 dwt, future
Freighter, larger than 8000 dwt
Freighter, larger than 8000 dwt, future
Freighter, smaller than 2000 dwt
Freighter, smaller than 2000 dwt, future
RoRo vessel, 2000-30000 dwt
RoRo vessel, 2000-30000 dwt, future

Air transports - 4 activities

Data documented by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published: 1998 02

Freight plane, MD-82, 300 km
Freight plane, MD-82, 600 km
Passenger plane, MD-82, 300 km
Passenger plane, MD-82, 600 km

Data on emissions from engines from material compiled within NGM (Network for Freight Transports and Environment) - 9 activities

Data documented by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published: 1998 02

Diesel engine, Euro 0
Diesel engine, Euro 1
Diesel engine, Euro 2

Diesel engine, future
Locomotive two-stroke engine
Medium speed, four-stroke diesel vessel engine, 80 % engine load
Medium speed, four-stroke diesel vessel engine, 20 % engine load
Slow speed, two-stroke diesel vessel engine, 80 % engine load
Slow speed, two-stroke diesel vessel engine, 20 % engine load

Data acquired in: Project employment for specific data projects

Data on production of crude oil and gas from Keiserås Bakkene K. "Life cycle data for Norwegian oil and gas"- 1 activity

Data documented by: Sara Ågren, project employed at Technical Environmental Planning, Chalmers University of Technology
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Extraction of crude oil and gas

Data on production of selected fuels from Blinge M. et al " Life cycle analysis of fuel"- 9 activities

Data documented by: Sara Ågren, project employed at Technical Environmental Planning, Chalmers University of Technology
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Production of ethyl alcohol using energy forest and the CHAP-method
Production of ethyl alcohol using energy forest and the CASH-method
Production of ethyl alcohol using energy forest and the enzym-method
Production of methanol using energy forest
Production of dimethylether from energy forest
Refining of crude oil in to diesel
Production of energy forest
Refining of crude oil in to petrol
Transportation of crude oil to Sweden

Data on the production and recycling of Aluminium, Copper and Steel from Sunér M. "Life cycle assessment of Aluminium, Copper and Steel"- 5 activities

Data documented by: Maria Erixon, project employed at Technical Environmental Planning, Chalmers University of Technology
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Virgin aluminium production
Copper production
Scrap-based aluminium production
Virgin steel production
Scrap-based steel production

Data from environmental reports of specific companies - 25 activities

Data documented by: Maria Erixson and Sara Ågren, project employed for the database project at Technical Environmental Planning, Chalmers University of Technology
Published 1997

Combustion of waste to generate heat and electricity
Flame laminate treatment of textiles
Manufacturing of polyurethane insulation
Metal surface treatment of car- and boat details
Preparation and anti-corrosive treatment of construction steel
Printing works
Production and assemblage of parts to the engineering industry
Production and refining of metal components
Production of cameras, magazines and accessories
Production of lubricating oil
Production of nonylphenol and dinonylphenol
Production of paint and anti corrosion agents
Production of paint, thinner and enamel mainly for surface treatment of steel
Production of plastic strips and film
Production of PVC
Production of self-adhesive labels etc used in the manufacturing, food and pharmaceutical industry
Recycling and temporary storage of metals
Retapping of cooling medium in tanks
Steeping of gas tanks
Storage and distribution of chemicals and intermediate storage of hazardous waste.
Treatment of hazardous waste from industries and municipalities
Treatment of oil-contaminated waste water
Treatment of sewage
Waste disposal
Waste disposal of building, industrial and hazardous waste

Data on production of different building materials from T. Björklund et al. "LCA of Building Frame Structures" - 17 activities

Data documented by: Maria Erixon, project employed for the database project at Technical Environmental Planning, Chalmers University of Technology
Documentation reviewed by: Thomas Björklund, Technical Environmental Planning, Chalmers University of Technology
Published 1997

Cement production
Coarse mortar production
Glulam wood production
K30 ready mixed concrete production
K40 ready mixed concrete production
Mounting profile production
Ore-based steel production
Particleboard production
Plasterboard production
Pre-stressing wire production
Reinforcement bar production
Sawed construction timber production
Scrap-based steel production
Steel jointing production
Steel rail production
Swedish reinforcement steel mix
Swedish sheet steel mix

Data acquired in: Request for 5 data sets from members of the CPM group for full access to SPINE@CPM

Data on production of PU based on a theoretical model and production of latex rubber – 2 activities

Data documented by: Ellen Riise, Mölnlycke AB
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Production of latex rubber
Manufacturing of PU elastics

Data on electricity production based on Frischknecht R. et al "Environmental Life-Cycle Inventories of Energy Systems" - 6 activities

Data documented by: Helena Greijer, ABB Corporate Research
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Hydro electricity energy system
Lignite electricity energy system
Natural gas electricity energy system
Nuclear electricity energy system
Oil electricity energy system
Stone coal electricity energy system

Data acquired in: Specific activities within the CPM group aimed at acquiring data during the project "Establishment of CPMs LCA database"

Industrial data acquisition (original Swedish name: 48 enhetsprocesser)

Data on production of copper from K.H. Bruch et al "Sachbilanz einer Ökobilanz der Kupfererzeugung und - verarbeitung" - 28 activities

Data documented by: Alena Ashkin, ABB Corporate Research
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Copper alloy casting of block metal from scrap
Copper casting and drawing to 0.06mm wire
Copper casting and drawing to 0.6mm wire
Copper casting and drawing to 8mm wire
Copper casting, drawing and laquering to 0.6mm wire
Copper casting, drawing and polmer coating to 0.6mm wire
Copper continuous casting
Copper extrusion and drawing to profiles
Copper extrusion and drawing to tubes
Copper ore mining and concentration
Copper rolling to strips
Copper skew rolling, pilgering and drawing to tubes
CuNi10Fe extrusion and drawing of tubes
CuNi10Fe extrusion and pilgering of tubes
CuNi10Fe semicontinuous casting
CuSn6 casting and drawing to wire

CuSn6 casting and rolling to strips
CuSn6 continuous casting
CuZn37 casting and drawing to wire
CuZn37 casting and extruding over core to tubes
CuZn37 casting and rolling to strips
CuZn37 continuous casting
CuZn37Pb chill casting
CuZn39Pb2 casting and pressing to rods
High purity copper production from primary raw materials
High purity copper production from secondary raw materials
Primary copper production
Red brass sandcasting

Data on degradation of pulp based on a theoretical model – 2 activities

Data documented by: Ellen Riise, Mölnlycke AB
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology,
Published 1997

Degradation of chemical pulp, CP, in a landfill
Degradation of chemo-thermo-mechanical pulp, CTMP, in a landfill

Data on production on selected polymers from APME reports - 11 activities

Data documented by: Sophie Louis, Volvo Technical Development
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Flexible PUR foam
General Purpose Polystyrene (GPPS)
MDI - PUR precursors
PET
Polyether-polyols - PUR precursors
Polyethylene
Polypropylene
PVC
Rigid PUR foam
TDI-PUR precursors

Data on silviculture inventoried by STORA Corporate Research AB - 11 activities

Data documented by: Göran Swan and Ola Svending, STORA Corporate Research
Documentation reviewed by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Clearing of young forest
Fertilizing in silviculture
Planting softwood plants
Soil preparation
Tree plant nursing
Diesel combustion
Diesel production
Final felling
Forwarding of harvested wood
N-fertilizer production
Thinning of forest area

Assessment of forms and policies for data acquisition and database input (original Swedish name: Datainmatning)

Data on electricty production from Brännström et al "Livscykelanalys för Vattenfalls elproduktion" - 9 activities

Data documented by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Combined heat and power plant with support systems
Gas-turbine power plant with support systems
Hydro-electric power station with support systems
Natural gas fired combination power plant with support systems
Nuclear power plant with support systems
Oil condensing power plant with support systems
Swedish electricity production system
Vattenfall electricity production system
Wind power plant with support systems

Data on different types of goods transportation from A-M Tillman, "Goods transportation in life cycle assessment" - 10 activities

Documentation and review of the report done by: Ann-Christin Pålsson, CPM/TEP, Chalmers University of Technology
Published 1997

Coastal shipping
High sea shipping
Rail transport - 10 trucks
Rail transport - 10 trucks
Rail transport - 52 trucks
Rail transport - 52 trucks
Tankers
Truck, long distance transportation
Truck, regional distribution
Truck, urban distribution

Appendix C. Sammanställning av CPM etapp II Datahandel

Sammanställning gjord av Maria Erixon 2001-09-25

Sammanfattning av datahandel med SPINE@CPM och SPINE@by-pass

Det sammanlagda värdet av data som distribuerats från SPINE@CPM är cirka 325 000 SEK, varav cirka 60 000 SEK (knappt 20%) kommit in i form av reda pengar. Distributionen innefattar externa och interna databeställningar som gjorts f.o.m. 1999/2000 (lite olika startdatum registrerade beroende på att dokumentationen är ofullständig) t.o.m. 2001-08-01.

SPINE@by-pass har sålts i tre exemplar, två direkt från CPM och en från vår återförsäljare CIT Ekologik. Detta har givit CPM en inkomst på cirka 25 000 SEK.

SPINE@CPM

Försäljningen av data i databasen SPINE@CPM har gjorts med olika betalningssätt:

- Externa organisationer eller personer (d.v.s. icke-CPM-medlemmar) har köpt data mot betalning i form av pengar (250-1 000 SEK per datamängd om de köps separat).
    - Inom ramen för ALMI-projektet ”Miljövarudeklaration” har data ur SPINE@CPM använts mot att en projektrapport, med utvärdering av SPINE-dataanvändningen inkluderad, har kommit CPM till godo.
    - Examensarbetare har fått tillgång till data från databasen mot att de i sin tur lämnat nygenererad SPINE-dokumenterad data för publicering i SPINE@CPM.
- Interna dataleveranser inom CPM-konsortiet, finansieras genom medlemmarnas naturainsatser som består av 5 SPINE-dokumenterade datamängder per företag och år som lämnas in till CPM för granskning och publicering i SPINE@CPM.

I tabellerna nedan kan man se information om externa och interna databeställningar som gjorts f.o.m. 1999/2000 (lite olika beroende på att dokumentationen inte varit fullständig från början) t.o.m. 2001-08-01. Redovisningen av den externa distributionen är förmodligen ganska fullständig, men den interna har pågått även före 2000-11-01.

Det sammanlagda värdet av data som distribuerats från SPINE@CPM är cirka 325 000 SEK, varav cirka 60 000 SEK (knappt 20%) kommit in i form av reda pengar.

Table presenting external data orders from SPINE@CPM 000101 -

No	*Date*	*Contact*	*Organisation*	*Quantity*	*Value*
1	2000-02-20	James	Royal Sch. of Mines S. Kensington	1	1 310
2	2000-09-20	Staffan Jansson	MODUL Service	1	1 310
3	2001-01-17	Jukka	Tampere Univ. Of	18	17 900
4	2001-01-18	Ross Galloway	Univ. Of Auckland	2	1 550
5	2001-02-21	Robert Svensson	CIT	8	8 300
6	2001-02-26	Anneli Sandberg	Göteborg Energi	1	1 300
7	2001-03-20	Gemma	Fundacion	1	950
8	2001-04-11	Jennie Ossmark	Kemibolaget i	1	550
9	2001-05-22	Anneli Sandberg	Göteborg Energi	42	10 300
10	2001-05-31	Niclas Svensson	Linköpings univ.	4	3 900
11	2001-07-04	Per Forsell	Noratel Elsund	13	10 900
12	2001-07-05	Jaeyeon Lee	Eco-Frontier Co.		
13	2001-08-30	Warren Porteous	Bentley West		
					58 270

Table presenting ALMI data orders from SPINE@CPM 001101- 010501.

No	*Date*	*Quantity (data sets)*	*Value (SEK)*
1	2000-11-20	26	13 250
2	2000-12-17	39	20 950
3	2000-12-21	10	8 000
4	2001-02-22	8	8 200
			50 400

Table presenting master thesis students' data orders from SPINE@CPM 001101- 010501.

No	*Date*	*Student*	*Quantity (data sets)*	*Value (SEK)*
1	2000-11-12	Åsa Ekdahl	-	
2	2000-11-17	Jesper Nilsson	17	12 000
3	2000-12-07	Elisabeth Ringström	-	
4	2001-12-07	Britta Kälvesten	6	4 850
				16 850

Table presenting internal data orders from SPINE@CPM 001101 - 010831.

No	*Date*	*Contact*	*Organisation*	*Quantity*	*Value*
1	2000-11-06	Charlotta Hultqvist	Electrolux Home Products	7	3 550
2	2000-11-14	Charlotta Hultqvist	Electrolux Home Products	3	2 200
3	2000-12-05	Marcus Wendin	Volvo Technologival Development	23	13 150
4	2000-12-20	Charlotta Hultqvist	Electrolux Home Products	6	2 200
5	2001-01-05	Charlotta Hultqvist	Electrolux Home Products	5	4 050
6	2001-01-11	Caroline Sjöberg	Volvo Technologival Development	3	1 650
7	2001-02-12	Ellen Riise	SCA Hygiene Products	2	1 400
8	2001-01-25	Patrik Klintbom	Volvo Technologival Development	4	2 650
9	2001-02-07	Markus Wendin	Volvo Technologival Development	1	1 200
10	2001-02-21	Karin Gäbel	Cementa AB	35	17 500
11	2001-02-22	Karin Gäbel	Cementa AB	5	5 200
12	2001-03-05	Charlotta Hultqvist	Electrolux Home Products	15	4 700
13	2001-03-05	Ulrika Palme	Chalmers, ESA	5	4 400
14	2001-03-22	Karin Gäbel	Cementa AB	36	36 200
15	2001-04-25	Caroline Settervall	Vattenfall	7	4 050
16	2001-05-03	Sofia Medin	Electrolux Home Products	35	10 200
17	2001-05-04	Lisbeth Dahllöf	Chalmers, ESA	43	21 550
18	2001-05-10	Patrik Klintbom	Volvo Technologival Development	18	17 800
19	2001-06-11	Birgit Nilsson	Akzo Nobel	42	10 620
20	2001-06-12	Björn Spak	SCA Hygiene Products	42	10 620
21	2001-08-30	Birgit Nilsson	Akzo Nobel	52	22 970
					197 860

SPINE@by-pass

CPM har sålt 2 SPINE@by-pass-databaser till ett sammanlagt värde av 19 750 SEK. CIT Ekologik är återförsäljare av SPINE@by-pass och har sålt ett exemplar av databasen, vilket givit CPM 5000 SEK, enligt avtal.