HOW COMPATIBLE ARE
THE SWISS ECOSPOLD
AND
THE SWEDISH SIRII SPINE
FORMATS FOR
DATA DOCUMENTATION AND EXCHANGE

October 21, 2003

Roland Hischier[1]
and Anna-Sofia Kumlin[2]
[1] Swiss Federal Laboratories for Material Testing and Research (EMPA),
Sustainable Information Technology Unit, Lerchenfeldstrasse 5, CH-9014 St. Gallen, Switzerland
roland.hischier@empa.ch
[2] IVL Swedish Environmental Research Institute Ltd,
Box 21060, SE-10031 Stockholm, Sweden
anna-sofia.kumlin@ivl.se

Content

- examined systems
  - **ecoinvent** and **EcoSpold** data(exchange)format
  - **Sirii ED network** and **Sirii/SPINE** documentation format
- data exchange …
- influence on data quality …
- example …
- conclusion & outlook

ecoinvent - the Swiss LCI database

- **harmonised, quality insured** and **updated** Life Cycle Inventories of materials and processes (~2'700 processes)
- valuable for **Swiss** and **western European** conditions
- publicly **accessible** via Internet (with fee) at **www.ecoinvent.ch**
- updated in a regular manner (= **every 2 years** new calculated)

This database allows to the industry ...

- a **much easier and faster** establishing of LCA's, and
- **strenghen** thus **acceptance & reliability** of its calculated results.

EcoSpold Data Exchange Format

Meta information		
	Process	
	Area DataSetInformation	Defines the kind of process or product system, and the version number of the data set.
	Area ReferenceFunction	Defines the product or service output to which all emissions and requirements are referred.
	Area TimePeriod	Defines the temporal validity of the data set.
	Area Geography	Defines the geographical validity of the data set.
	Area Technology	Describes the technology(ies) of the process.
	Modelling and validation	
	Area Representativeness	Defines the representativeness of the data used.
	Area Sources	Lists the literature and publications used.
	Area Validations	Lists the reviewers and their comments.
	Administrative information	
	Area DataEntryBy	Documents the person in charge of implementing the data set in the database.
	Area DataGeneratorAndPublication	Documents the originator and the published source of the data set.
	Area Persons	Lists complete addresses of all persons mentioned in a data set.
Flow data		
	Area Exchanges	Quantifies all flows from technical systems and nature to the process and from the process to nature or other technical systems.
	Area Allocations	Describes and quantifies allocation procedures and factors, respectively, required for multi-function processes.

the Swedish Sirii ED network

- Sirii ED Application =

  a **commonly accessible** (available free of charge at **www.sirii.org**), **user-friendly application** for environmental (LCI) data

- Sirii ED Platform =

  a **database network**, where well-documented **environmental data**, generated at the Sirii Institutes are **publicly available**

This application helps ...

- to facilitate a **time- and cost-efficient**, product-oriented **environmental** work within companies

IVL

Sirii / SPINE data documentation format

Meta information

- Technical System
  - *Name*
  - *Type of Technical System*
  - *Sector*
  - *Geographical Site Location*
  - *Description System Content*
  - *Significant System Data Gaps*
  - *Owner*
- Choices
  - *Intended User*
  - *General Purpose*
  - *Detailed Purpose*
  - *Commissioner*
  - *Original Practitioner*
  - *LCI/LCA Reviewer*
  - *Functional Unit*
  - *Functional Unit (motivation and explanation)*
  - *System Boundaries to the Environmental System*
  - *System Boundaries in Time*
  - *Geographical Coverage*
  - *Allocation Rules for Material Recycling*
  - *Description of Allocations at a Unit Process Level*
  - *Description of System Expansion*
  - *Other System Boundaries*

Meta information

- Methods of Aquiry
  - *Time Period during which data was acquired*
  - *Type of Method*
  - *Description of Method*
  - *What Data Represents*
  - *References*
  - *Further Notes*
  - *Data Quality*
- Recommendations
  - *Data Representativeness*
  - *Data Completeness*
  - *Data Technology Coverage*
  - *Data Precision*
  - *Further Notes*
  - *When Data was Completed*
- General Information
  - *Original Publication(s)*
  - *Sirii Documentation Performed By*
  - *Sirii Review*
  - *Availability*
  - *Copyright*

Flow data

- *Flow Data*

Data exchange of meta information

Aspect of data set	Data exchange	
	Sirii to ecoinvent	ecoinvent to Sirii
Name of technical system/unit process	1	1
Description of system content including significant system data gaps	1	1
Original practitioner/ Data generator	2	2
LCI/LCA reviewer/ Validation	2	2
Functional unit (short description, amount and unit)	2	1
Geographical coverage	1	2
Time coverage	1	2
Data representativeness and technology coverage / extrapolations and process information on technology	1	1
Data completeness and precision/ uncertainty adjustments	1	1
Original publication	3	1

1

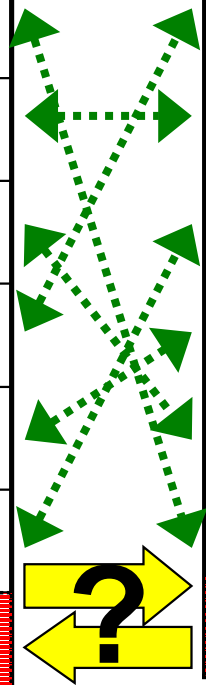
2

IVL

Example 1

Sirii/SPINE

Company	IVL Swedish Environmental Research Institute Ltd.
MailAddress	P.O. box 210 60, 100 31 Stockholm, Sweden
EMailAddress	annsie.kumlin@ivl.se
Name	Anna-Sofia Kumlin
Fax	+46 8 598 563 90
Telephone	+46 8 598 563 00
Comments	



EcoSpold

name	Roland Hischier
address	Lerchenfeldstrasse 5, 9014 St.Gallen
telephone	0041 71274 7847
telefax	0041 71 274 7862
email	roland.hischier@empa.ch
companyCode	EMPA-SG
countryCode	CH

Example 2 (ecoinvent -> sirii)

Sirii/SPINE

original publication(s)	Zah R., Hischier R (2003) Life-Cycle Inventories of Detergents; Final report ecoinvent 2000; Volume 12; Swiss Centre for LCI, EMPA; Dübendorf, CH (CD-Rom).

EcoSpold

sourceType	3
firstAuthor	Zah, Rainer
additionalAuthor	Hischier, Roland
Year	2003
Title	Life Cycle Inventories of Detergents
pageNumbers	
nameOfEditors	
titleOfAnthology	Final report ecoinvent 2000
placeOfpublication	Dübendorf, CH
Publisher	Swiss Centre for LCI, EMPA
Journal	
volumeNo	12
issueNo	
Text	CD-Rom

Example 2 (sirii -> ecoinvent)

Sirii/SPINE

original publication(s)	Uppenberg, S. et al. (2001) \"Miljöfaktabok för bränslen\". IVL-report 1334B-2. IVL Swedish Environmental Research Institute. Stockholm. Sweden. \r\n¤hman (1999) LCI för tallbecksolja. IVL-internal material. IVL Swedish Environmental Research Institute. Stockholm. Sweden. \r\nBodström, C-¤ et al. (1998) Emissionsfaktorer för energiproduktion, IVL-internal material, Swedish Environmental Research Institute, Stockholm, Sweden.

EcoSpold

sourceType	
firstAuthor	
additionalAuthor	
Year	
Title	
pageNumbers	
nameOfEditors	
titleOfAnthology	
placeOfpublication	
Publisher	
Journal	
volumeNo	
issueNo	
Text	

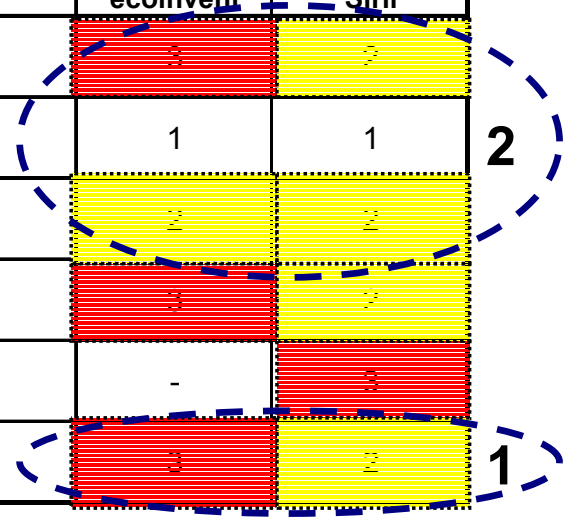
Consequences (meta data)

- An exchange **without any lost** of information / quality is at the moment **not possible**
- Two **cases** of **differences** between the two systems:
  - An **extra** documentation **field without a homologue** in the other format
  - **One** field that contains same information **as several** fields in the other format
- Aspects of meta information that are considered of importance are **the same** for both formats
- For complete compatibility, **few modification** in either of the formats need to be made

IVL

Data exchange of flow data

Aspect of data set	Data exchange	
	Sirii to ecoinvent	ecoinvent to Sirii
Inputs (resources)	3	3
Inputs (technosphere process)	1	1
Output (emissions, waste)	1	1
Output (product(s))	3	3
Uncertainty information	-	3
Allocation	3	3



Example 1 - allocation data

Sirii SPINE

Allocation rules for material recycling	• Recycled materials are accounted for in the inventory profile e.g. 1 kg recycled steel (as in the EPD system) • 50/50 rule is used according to the Nordic Guidelines • Other method is used to give recycled material a value - specified in the comments field • Not valid, no recycled material is used or produced
Description of allocation at a unit process	• Physical relations • Mass • Energy • Price • Unknown • Not relevant
Description of system expansions	• Qualitative description

EcoSpold

referenceTo CoProduct	Chlorine
Allocation Method	1
fraction	46.4%
explanation	Mass allocation
referenceTo InputOutput	Sodium chloride Water, process, ... Infrastructure etc.

Example 2

Sirii/SPINE

Group Theme	FlowType	Specification
Deliverables	Product	
Incomplete Inventory	refined resource	
	residue	input
		output
Resource use	natural resource	
	recycled material	input
		output
Stressors	Emission	air
		ground
		intermediate
		water
	Exploitative impact	
	resource consumption	

?!

?

?

?

?

?

SubCategory	Category	Input/OutputGroup
"Subcategory xy"	"Category"	from technosphere
in air	resource	from nature
biotic		
in ground		
land		
in water		
low population density	air	to nature
low pop. dens., long-term		
high population density		
stratsophere / troposphere		
unspecified		
ground	water	
ground, long-term		
lake		
ocean		
river		
river, long-term		
fossil		
unspecified		
agriculture	soil	
forestry		
industrial		
unspecified		
"Subcategory xy"	"Category"	referenceProduct
"Subcategory xy"	"Category"	allocatedByProduct

EcoSpold

IVL

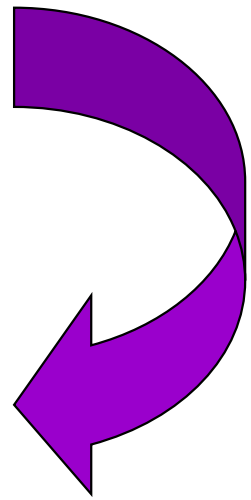
Example (EcoSpold -> Sirii SPINE -> EcoSpold)

EcoSpold

Air		
12.05	g	NOx, high population density
150.23	g	NOx, low population density
Water		
0.05	g	Cd ion, river
125.2	g	Cd ion, river long-term

Sirii/SPINE

Air		
162.28	g	NOx
Water		
125.25	g	Cd, ion



EcoSpold

Air		
162.28	g	NOx, unspecified
Water		
125.25	g	Cd ion, unspecified

IVL

Consequences (flow data)

- Changes in data quality are **much higher** – mainly due to differences in the philosophy of the two systems

ecoinvent	• cut off for recycable materials • exchanges with nature: category (e.g. air) & subcategory (high pop. density) • mean value & uncertainty value
Sirii ED network	• recycable materials: different rules possible • exchanges with nature: category • additional flow types (e.g. residue input) • qualitative information of uncertainty (optional)

Consequences (flow data) / II

- **Difficult** to integrate a Sirii/SPINE dataset into the EcoSpold format **without additional information** or **loss of information**.

- Integration of EcoSpold dataset into the Sirii SPINE format results in a **loss** of

  (i) **subcategory information** of exchanges with nature

  (ii) **uncertainty information**.

Conclusions

- Several **common points** exist !
- **Meta** information -> both format consider same aspects as important / **few** modification needed
- **Flow** data -> Differences due to **different philosophies**

➔ loss of **significant** information (= loss of quality) !

Harmonisation of philosophy / general framework (nomenclature / allocation / recycable materials / etc.) is crucial for a data exchange with no loss of quality between two formats !

IVL

Acknowledgements

- **Rolf Frischknecht** for his valuable comments on the intermediate results;
- Our heads of department, **Lars-Gunnar Lindfors** & **Prof. Lorenz Hilty**, for making this work possible;
- Management Committee of **COST Action 530** for making this **STSM** (Short Term Scientific Mission) possible;
- … and **you** for your attention. Thank you!

IVL