

# Technical Helpdesk for National LCA Databases

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## **Training on Data Acquisition and Dataset Development – Part 8 – Linking datasets, databases, and LCA software**

Content from Andreas Ciroth, GreenDelta and Amir Safaei, ecoinvent

August 2017 Version

**Managed by SETAC**

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# Linking databases and LCA software

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## LCA Software

- GaBi
- SimaPro
- openLCA
- Umberto

# Linking databases and LCA software

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## LCA Software

- GaBi
- SimaPro
- openLCA
- Umberto
- Freeware tools
- Specific tools for sectors

# Linking databases and LCA software

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## LCA Software

- There is (of course) a common core of features and models that all main LCA software systems support, however:
- Differences:
  - Supported import and export formats
  - Modeling concepts and modeling features
    - Parameters
    - How processes are linked
    - ...
  - Open source vs closed source tools

# Linking databases and LCA software

## LCA Software

EF remodelling project

### Interface paper

Version 1.0.1

May 2<sup>nd</sup>, 2017

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EF remodelling project

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# Linking databases and LCA software

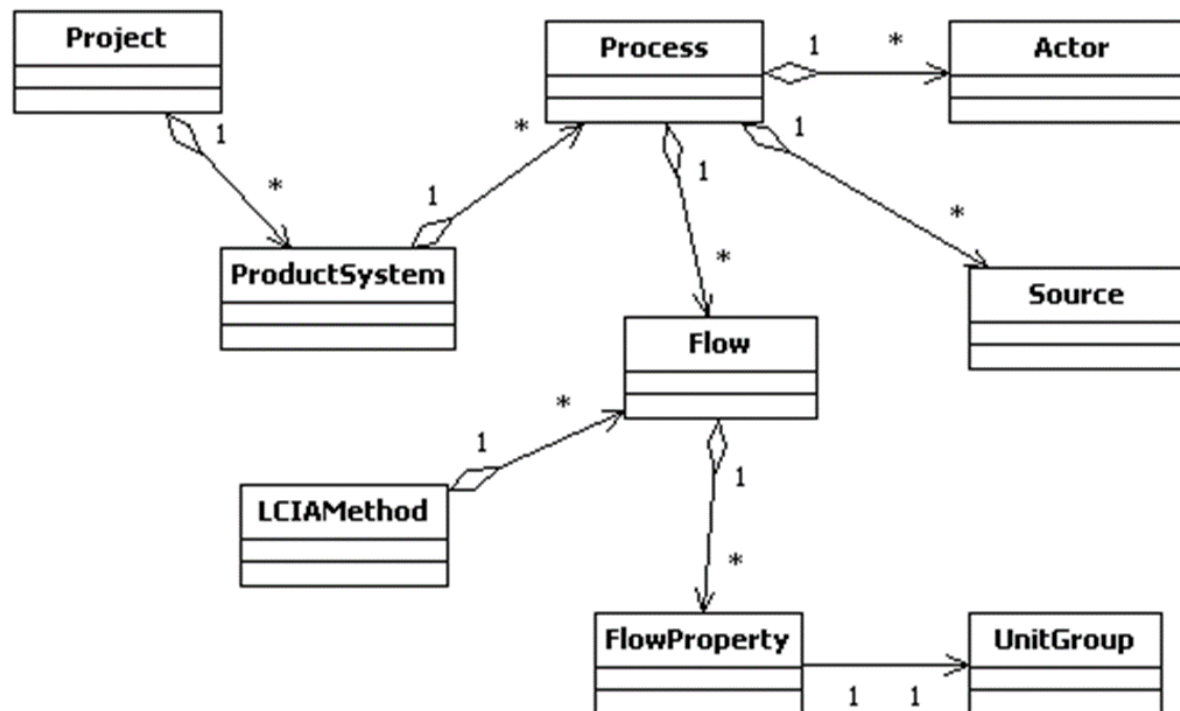
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## Data formats?

- Define how data is stored and how data is exchanged between different applications
- Usually interesting for users (if at all): data *exchange formats*, also in LCA

# Data structures in databases

(Basic structure of early openLCA, as UML diagram → many of these elements are present in LCA data formats)



# Data formats: ISO14048/TS

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- Precursor of all modern LCA data formats
- Too generic to allow for smooth conversion between different, ISO14048-compliant LCA data formats

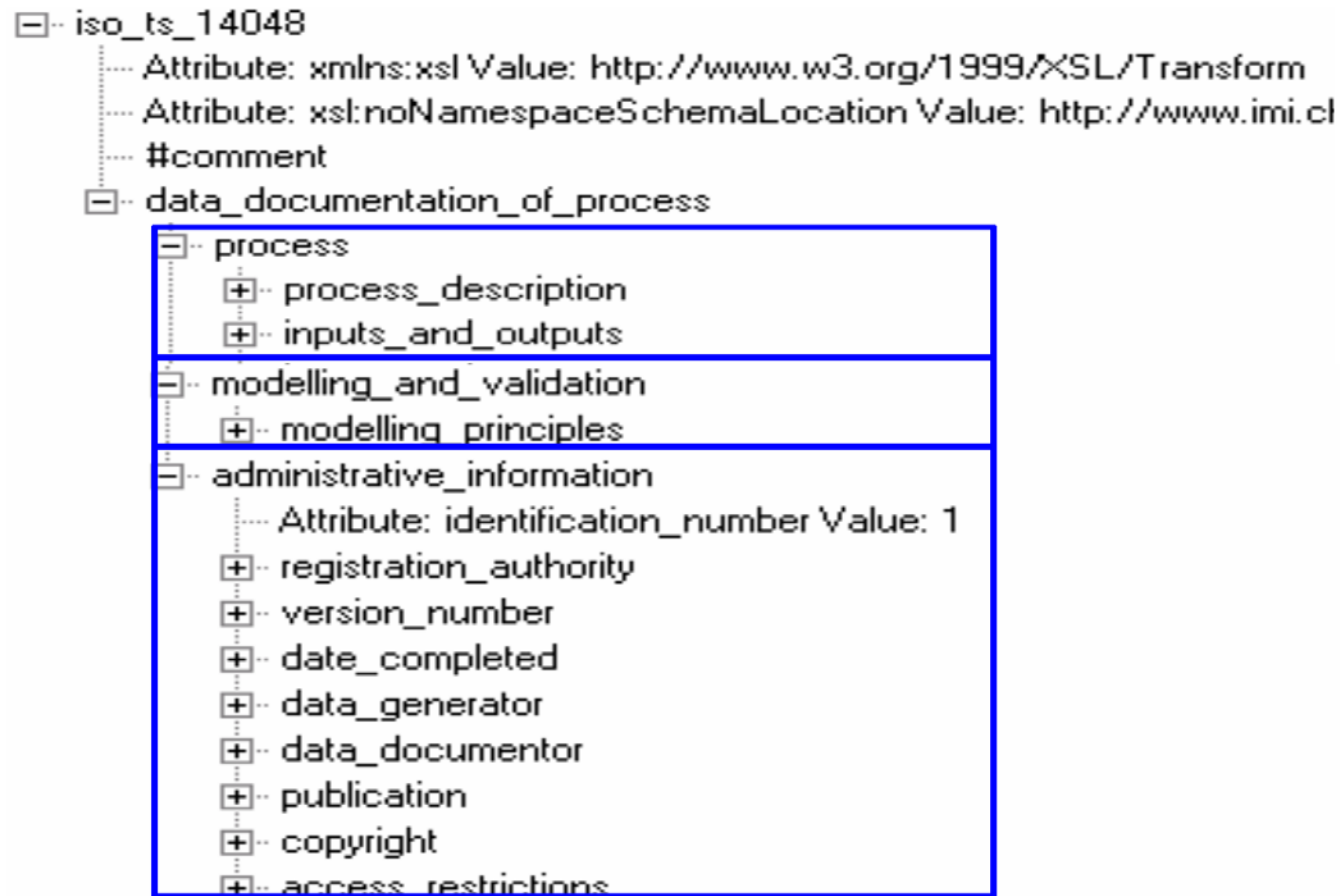




# ISO14048 compliant data formats: ISO@Spine

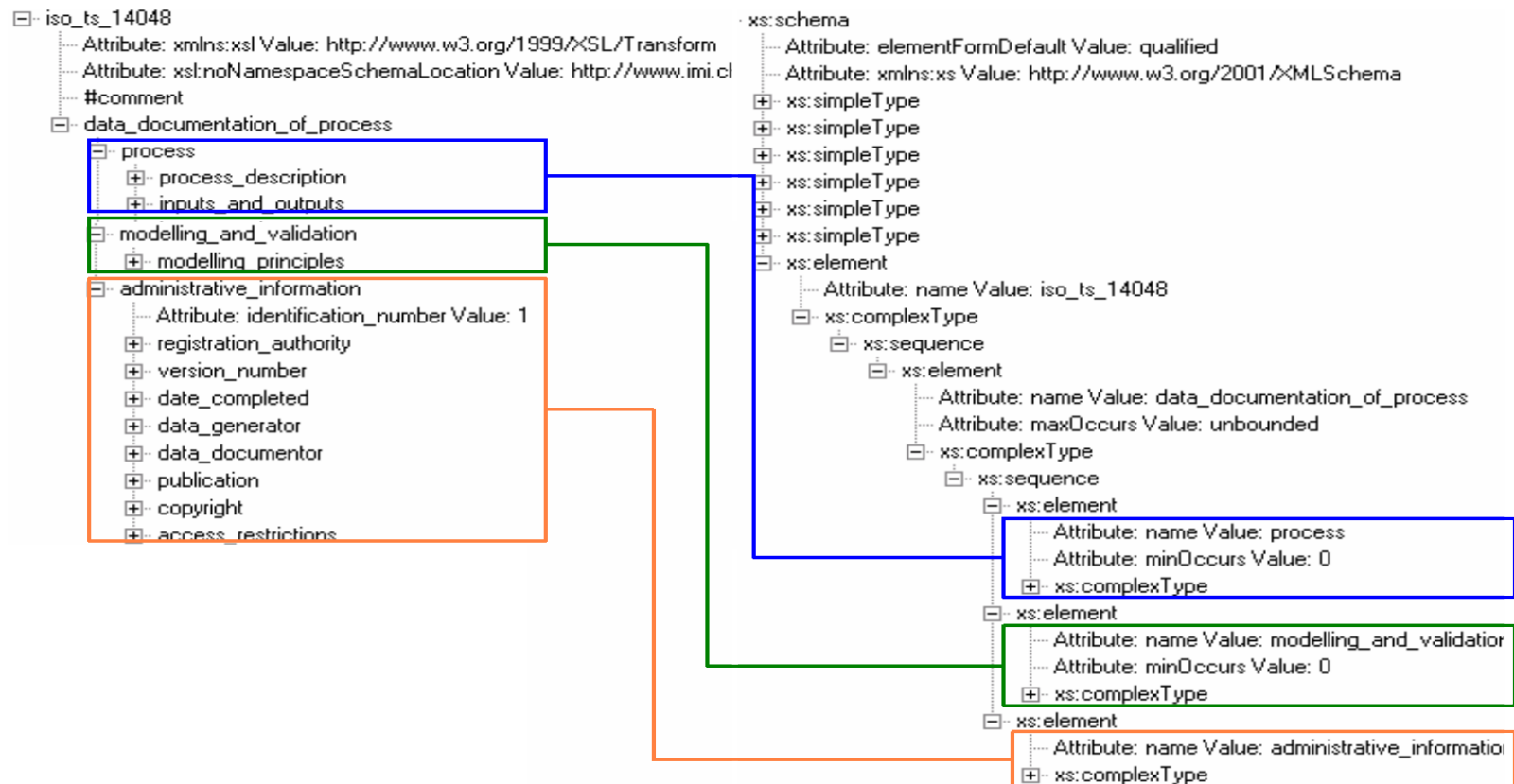
## Basic data set structure [Carlson, Palsson 2002]

---

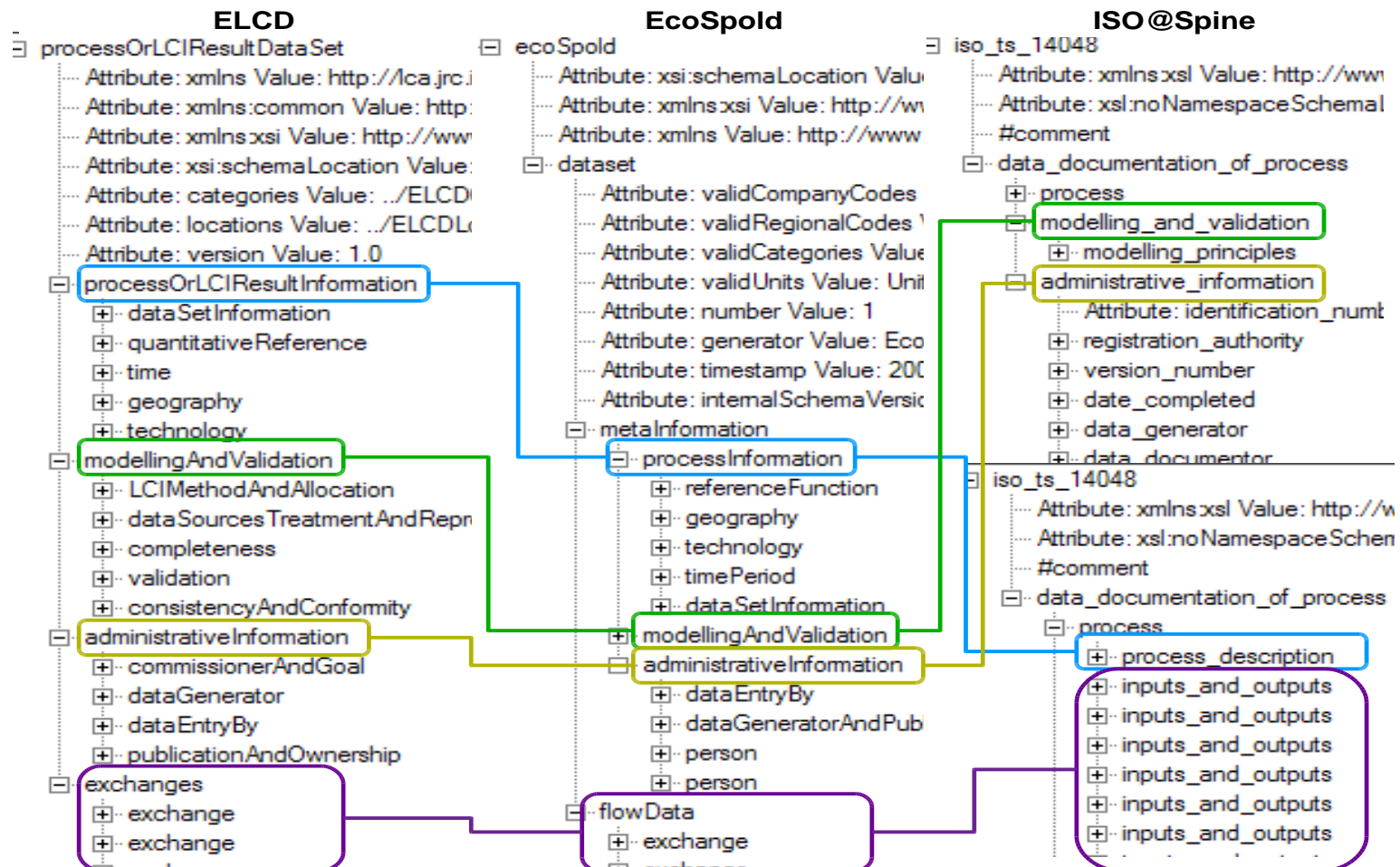


# ISO14048 compliant data formats: ISO@Spine

## relation ISO14048 structure – ISO@Spine structure



# ISO-14048 compliant data formats: relations



# ISO-14048 compliant data formats: **EcoSpold v.1**

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- **ecoinvent database**, broadly supported as exchange format

## **EcoSpold (v1) limitations**

- No support for parameters in data sets
- Only two languages
- No (real) distinction between process and flow/product

# ISO-14048 compliant data formats:

## EcoSpold 2

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### ecoinvent database v3

- Overcomes all limitations mentioned in previous slide
- In principle better alignment with ILCD data format (→ next slides)
- BUT adds new complexity (built „intelligence“ into the data format, parent-child processes)
- openLCA the only LCA software which has implemented EcoSpold2 so far
- Format used by ecoinvent 3 & ecoeditor is different from the public format and not documented (!)

# ISO-14048 compliant data formats: **ILCD** formerly ELCD, by JRC, European commission

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- Overcomes all limitations mentioned in ecoinvent 1 slide (parameters, multi-language, process/product)
- BUT is rather administrative (author for many single entries; many different languages possible in one data set, ...)
- One data set consists of literally > 10,000 single xml files that are organised in a file structure, with one file missing the whole process data set is invalid (ELCD III example)
- GaBi provides good support for this format, openLCA too

# All formats so far: XML formats

```
<?xml version="1.0" encoding="utf-8"?><CR LF
<?xml-stylesheet version="1.0" href="../../stylesheets/process2html.xsl" type="text/xsl"?><CR LF
<processDataSet xmlns="http://lca.irc.it/ILCD/Process" xmlns:common="http://lca.irc.it/ILCD/Common" xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://lca.irc.it/ILCD/Process ../../schemas/ILCD_ProcessDataSet.xsd" locations="../../ILCDLocations.xml" version="1.1"><CR LF
  <processInformation><CR LF
    <dataSetInformation><CR LF
      <common:UUID>0deb15f0-518a-11dd-ae16-0800200c9a66</common:UUID><CR LF
      <name><CR LF
        <baseName xml:lang="en">Process: steam from natural gas</baseName><CR LF
        <treatmentStandardsRoutes xml:lang="en">heat plant</treatmentStandardsRoutes><CR LF
        <mixAndLocationTypes xml:lang="en">consumption: mix, at plant</mixAndLocationTypes><CR LF
        <functionalUnitFlowProperties xml:lang="en">MJ</functionalUnitFlowProperties><CR LF
      </name><CR LF
      <classificationInformation><CR LF
        <common:classification><CR LF
          <common:classificationLevel="0">Energy carriers and technologies</common:classificationLevel><CR LF
          <common:classificationLevel="1">Heat and steam</common:classificationLevel><CR LF
        </common:classification><CR LF
        <common:generalComment xml:lang="en">Good overall data quality. Energy carrier mix information based on official statistical information including import / export. A
          heat plant model was used, which combine measured emissions plus calculated values for not measured emissions of e.g. organics or heavy metals. Energy carrier extrac
          and processing data is of sufficient to good (e.g. refinery) data quality. Inventory is partly based on primary industry data, partly on secondary literature<CR LF
        </common:generalComment><CR LF
      </dataSetInformation><CR LF
      <quantitativeReference type="Reference: flow(s)"><CR LF
        <referenceToReferenceFlow>60</referenceToReferenceFlow><CR LF
      </quantitativeReference><CR LF
      <time><CR LF
        <common:referenceYear>2002</common:referenceYear><CR LF
        <common:dataSetValidUntil>2010</common:dataSetValidUntil><CR LF
        <common:timeRepresentativenessDescription xml:lang="en">Annual average</common:timeRepresentativenessDescription><CR LF
      </time><CR LF
      <geography><CR LF
        <locationOfOperationSupplyOrProduction location="AT"><CR LF
          <descriptionOfRestrictions xml:lang="en">The data set represents the country / region specific situation, focusing on the main technologies, and the region specific
            characteristics.</descriptionOfRestrictions><CR LF
        </locationOfOperationSupplyOrProduction><CR LF
      </geography><CR LF
      <technology><CR LF
        <technologyDescriptionAndIncludedProcesses xml:lang="en">The process steam is produced in a natural gas specific heat plant. The Austrian specific fuel supply (share of
          resources used, by import and / or domestic supply) including the Austrian specific energy carrier properties (e.g. element and energy contents) are accounted for.
          Furthermore Austrian specific technology standards of heat plants regarding efficiency, firing technology, flue-gas desulphurisation, NOx removal and dedusting are
          considered. The Austrian emission factors can be found in the table below in the corresponding column. The data set considers the whole supply chain of the fuels from
          exploration over extraction and preparation to transport of fuels to the heat plants. Furthermore the data set comprises the infrastructure as well as end-of-life of
          plant. The background system is addressed as follows: Transports: All relevant and known transport processes used are included. Overseas transports including rail
          truck transport to and from major ports for imported bulk resources are included. Furthermore all relevant and known pipeline and / or tanker transports of gases and
          imports are included. Energy carriers: Coal, crude oil, natural gas and uranium are modelled according to the specific import situation. Refinery products: Diesel,
          gasoline, technical gases, fuel oils, basic oils and residues such as bitumen are modelled via a country specific, refinery parameterized model. The refinery model
          represents the current national standard in refinery techniques (e.g. emission level, internal energy consumption, ...) as well as the individual country specific pro
          output spectrum, which can be quite different from country to country. Hence the refinery products used show the individual country specific use of resources. The su
          crude oil is modelled, again, according to the country specific crude oil situation with the respective properties of the
          resources.</technologyDescriptionAndIncludedProcesses><CR LF
        <technologicalApplicability xml:lang="en">Process steam (MJ) at heat plant for final consumers.</technologicalApplicability><CR LF
        <referenceToTechnologyFlowDiagramOrPicture refObjectId="1318f4ce-5fba-11db-b0de-0800200c9a66" type="source: data set"><CR LF
          <uri>../../sources/1318f4ce-5fba-11db-b0de-0800200c9a66.xml</uri><CR LF
        </referenceToTechnologyFlowDiagramOrPicture><CR LF
        <referenceToTechnologyFlowDiagramOrPicture refObjectId="151451e5-4418-11dd-ae16-0800200c9a66" type="source: data set"><CR LF
          <uri>../../sources/151451e5-4418-11dd-ae16-0800200c9a66.xml</uri><CR LF
        </referenceToTechnologyFlowDiagramOrPicture><CR LF
        <common:shortDescription xml:lang="en">PE_LBP_GaBi_Energy_Emissionfactors_AT_1318f4ce-5fba-11db-b0de-0800200c9a66.JPG</common:shortDescription><CR LF
        <referenceToTechnologyFlowDiagramOrPicture refObjectId="151451e5-4418-11dd-ae16-0800200c9a66" type="source: data set"><CR LF
          <uri>../../sources/151451e5-4418-11dd-ae16-0800200c9a66.xml</uri><CR LF
        </referenceToTechnologyFlowDiagramOrPicture><CR LF
        <common:shortDescription xml:lang="en">PE_LBP_GaBi_Energy_Steam_from_Natural_Gas_LCA_151451e5-4418-11dd-ae16-0800200c9a66.JPG</common:shortDescription><CR LF
        <referenceToTechnologyFlowDiagramOrPicture refObjectId="151451e5-4418-11dd-ae16-0800200c9a66" type="source: data set"><CR LF
          <uri>../../sources/151451e5-4418-11dd-ae16-0800200c9a66.xml</uri><CR LF
        </referenceToTechnologyFlowDiagramOrPicture><CR LF
      </technology><CR LF
    </processInformation><CR LF
  </processDataSet><CR LF
</processDataSet><CR LF
```

# All formats so far: XML formats

---

```
...<geography>CRLF
...<locationOfOperationSupplyOrProduction location="AT">CRLF
...<descriptionOfRestrictions xml:lang="en">The data set represents the country
...technologies, and the region specificCRLF
...characteristics.</descriptionOfRestrictions>CRLF
...</locationOfOperationSupplyOrProduction>CRLF
...</geography>CRLF
```



# Recent Development: JSON-LD “2LD” data format

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- ISO 14048/TS compliant but not an XML format
- Developed by GreenDelta for US EPA, in openLCA
- Motivation:
  - XML is inefficient, „too wordy“, for larger amounts of data
  - Link to ontologies for data analyses and data creation
- JSON-LD: Developed /pushed by google, yahoo, IBM < 5 years ago -> optimised for not too well organised data, huge amounts of data

# Recent Development: JSON-LD “2LD” data format

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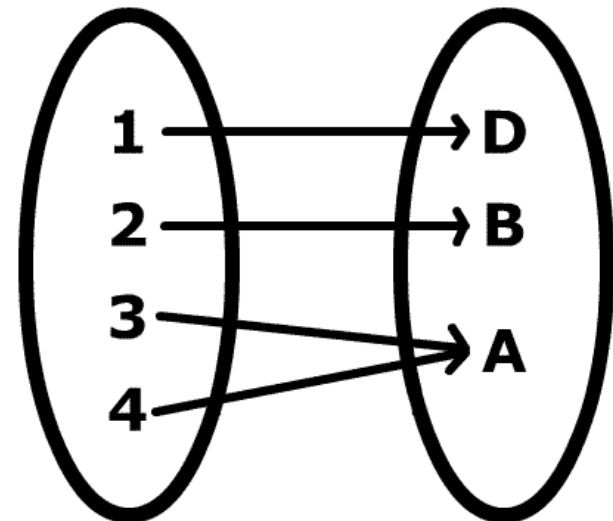
- <http://greendelta.github.io/olca-schema/>
- E.g., location:

```
→ "location": {  
→   → "@type": "Location",  
→   → "@id": "d66c264e-1dbd-33e6-911d-3ffc70908e8e",  
→   → "name": "Europe"  
→ },
```

# Format conversion


























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- Task: converting LCA data sets from one format to the other
  - Converting the data format fields
  - Converting the nomenclature systems: „mapping“ of reference data



# Format conversion: mapping files

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-  ES1\_COMPARTMENTS.csv
-  ES2\_GEOGRAPHIES.csv
-  FLOW\_MAP\_ILCD\_TO\_ES1.csv
-  ILCD\_ELEM\_FLOWS.csv
-  ILCD\_UNIT\_GROUPS.csv
-  UNIT\_MAP\_ES1\_TO\_ILCD.csv
-  UNIT\_MAP\_ES2\_TO\_ILCD.csv
-  COMPARTMENT\_MAP\_ES1\_TO\_ES2.csv
-  COMPARTMENT\_MAP\_ES1\_TO\_ILCD.csv
-  COMPARTMENT\_MAP\_ES2\_TO\_ILCD.csv
-  COMPARTMENT\_MAP\_ILCD\_TO\_ES1.csv
-  COMPARTMENT\_MAP\_ILCD\_TO\_ES2.csv
-  ES1\_ELEM\_FLOWS.csv
-  ES2\_COMPARTMENTS.csv
-  ES2\_ELEM\_FLOWS.csv
-  ES2\_TO\_CSV\_COMPARTMENT\_MAP.csv
-  ES2\_TO\_CSV\_ELECTRICITY\_UNITS.csv
-  ES2\_TO\_CSV\_GEOGRAPHY\_MAP.csv
-  ES2\_UNITS.csv
-  FLOW\_MAP\_ES1\_TO\_ILCD.csv
-  FLOW\_MAP\_ES2\_TO\_ILCD.csv
-  FLOW\_MAP\_ILCD\_TO\_ES2.csv
-  ILCD\_COMPARTMENTS.csv
-  ILCD\_FLOW\_PROPERTIES.csv
-  UNIT\_MAP\_ILCD\_TO\_ES2.csv

# Format conversion: mapping files

```
FLOW_MAP_ILCD_TO_ES2.csv
1 "041f5cf4-6556-11dd-ad8b-0800200c9a66","0db53406-fb79-497d-a9e7-fc2c8d425b81",true,1
2 "041f5cf5-6556-11dd-ad8b-0800200c9a66","f228fcae-8e19-4a73-9d8c-60ec8adaea50",true,1
3 "041f5cf7-6556-11dd-ad8b-0800200c9a66","b066708e-5bab-45ee-9244-e1be2fa5b5f3",true,1
4 "041f5cf9-6556-11dd-ad8b-0800200c9a66","ef7bc7b8-f85b-4687-9cb1-eb60384650fa",true,1
5 "041f5cfa-6556-11dd-ad8b-0800200c9a66","651bd1c1-458e-4585-94e1-46409196de89",true,1
6 "041f5cfc-6556-11dd-ad8b-0800200c9a66","84cd61aa-92a0-40d1-aad5-e9e5c0d4c93e",true,1
7 "041f5d12-6556-11dd-ad8b-0800200c9a66","4aecbaff-32ae-4655-9587-db9337d0d350",false,1
8 "041f8403-6556-11dd-ad8b-0800200c9a66","a8a2f53b-c6d2-4302-a59f-502bd7e242fc",false,1
9 "041fab15-6556-11dd-ad8b-0800200c9a66","9cda96ce-e1cf-4192-8614-52be32d200f4",true,1
10 "041fd212-6556-11dd-ad8b-0800200c9a66","e4ff4151-febe-4c3f-bfaf-924d6f7bf101",false,1
11 "041fd214-6556-11dd-ad8b-0800200c9a66","bb656df7-0d8a-427c-b58c-02962e50df57",false,1
12 "041fd220-6556-11dd-ad8b-0800200c9a66","745503c2-768d-4f2c-b63c-bb75c1c5419c",false,1
13 "041fd248-6556-11dd-ad8b-0800200c9a66","1f5330ac-e81c-45f2-8c9c-335b531faab0",true,1
14 "041ff923-6556-11dd-ad8b-0800200c9a66","1f5330ac-e81c-45f2-8c9c-335b531faab0",true,1
15 "041ff94b-6556-11dd-ad8b-0800200c9a66","2ffff3bda-1eec-4166-9969-bc9e757c8e8e",false,1
16 "041ff94d-6556-11dd-ad8b-0800200c9a66","909bc093-18b2-4a7e-8131-16f68eebc193",false,1
17 "04202031-6556-11dd-ad8b-0800200c9a66","f9727bfb-d8e3-432c-8feb-2dc43da4c37d",true,1
18 "04202046-6556-11dd-ad8b-0800200c9a66","8bc09c04-2190-4ee2-9ee2-ae988ccd4e0c",false,1
19 "04202047-6556-11dd-ad8b-0800200c9a66","c0dd7ccd-9e7a-42b3-b899-dfd18c2150ca",false,1
20 "04202048-6556-11dd-ad8b-0800200c9a66","a7ff17d4-d3fe-4a70-9f2e-392b34630772",false,1
21 "0420204a-6556-11dd-ad8b-0800200c9a66","57c71b25-4663-4fad-9167-7ce5be3e8268",false,1
22 "04202055-6556-11dd-ad8b-0800200c9a66","50f528ca-45e7-42d0-b399-998ea63ddabf",false,1
23 "0420474c-6556-11dd-ad8b-0800200c9a66","40022b1f-8906-4c54-a074-bf1a3fc9b13f",false,1
24 "04206e78-6556-11dd-ad8b-0800200c9a66","5eb2d548-1694-496d-b3bd-a439984fca7d",false,1
25 "08a91e70-3ddc-11dd-904b-0050c2490048","1aa8fd2e-9fbb-4701-8250-f4e31254b84a",false,1
26 "08a91e70-3ddc-11dd-9077-0050c2490048","b0cdbbc78-e226-4e8b-97ff-3a557ab7ab55",false,1
27 "08a91e70-3ddc-11dd-9083-0050c2490048","7db70809-e30b-4633-992e-2cfe03891907",false,1
28 "08a91e70-3ddc-11dd-90ca-0050c2490048","863ebe6d-0f48-4c32-94df-a6369f963a2e",false,1
29 "08a91e70-3ddc-11dd-90d2-0050c2490048","d2885a24-b728-4832-8638-15697630eff9",false,1
```

# Format converter and LCA software for converting data sets

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- Format converter: Developed since 2007 by GreenDelta, with support of various stakeholders (PRé, thinkstep, ecoinvent, UN, JRC)
- Converts various LCA data formats
- Open source and free tool
- <http://www.openlca.org/format-converter/>



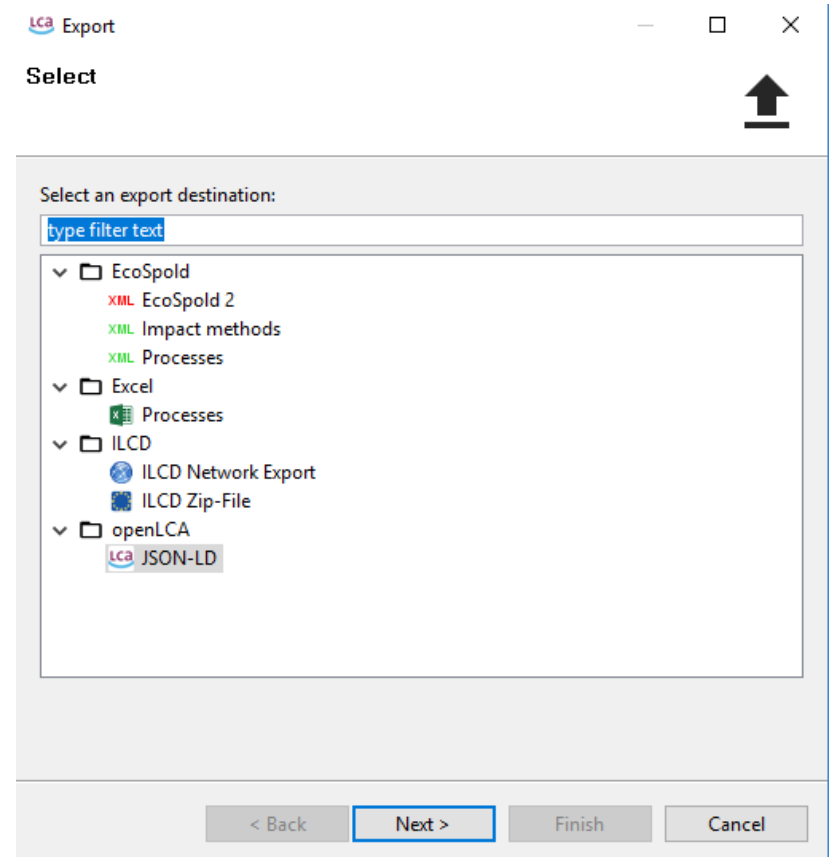
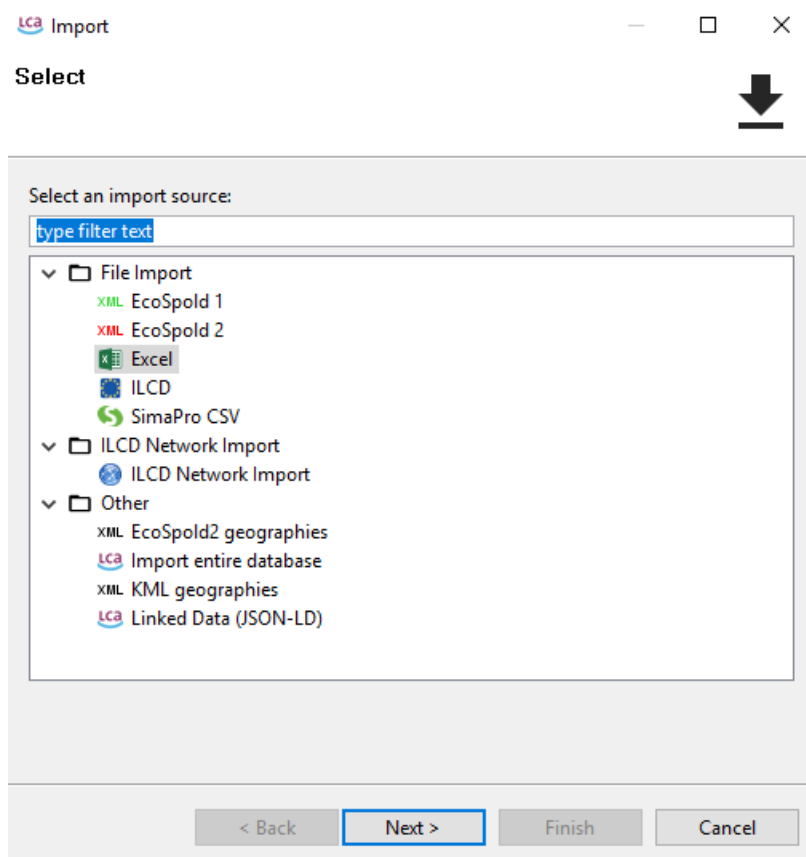
# Format converter and LCA software for converting data sets

- Format converter: supported formats

from/to	EcoSpold 1	EcoSpold 1 (SimaPro)	EcoSpold 2	ILCD 1.1	CSV (SimaPro)
EcoSpold 1		x	x	x	-
EcoSpold 1 (SimaPro)	x		x	x	-
EcoSpold 2	x	x		x	x
ILCD 1.1	x	x	x		-
CSV (SimaPro)	-	-	x	-	

# Format converter and LCA software for converting data sets

- openLCA: supported import and export formats





# Format conversion: status

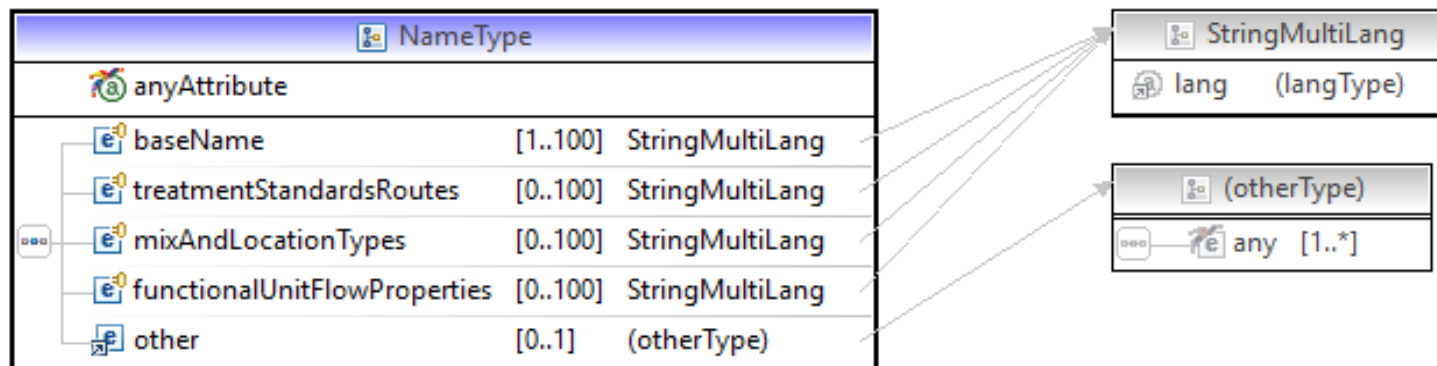
---

- Conversion is possible of course, tools like openLCA and the format converter can be used and can also be integrated into websites e.g.
- However, quite **some fields and field requirements between formats are incompatible**
  - Infrastructure:
    - required field in EcoSpold1 for a process data set
    - Not foreseen in ILCD

# Format conversion: status

- Process name: 120 characters max in EcoSpold02, 100 characters in ILCD

ILCD\_ProcessDataSet.xsd



Name	FieldID	SpoldID, version 1	Options	Type	Size	Multiple Occurence	Req
activityName	100	401-rename		TString120	120	No	Yes

A name for the activity that is represented by this dataset.


# Format conversion: **status**

---

- Format conversion is possible, but works only to some extent.
- Tool support is available, but typically, for a full conversion, special „treatment“ of datasets is needed in addition to better capture the content
  - Store information in other fields
  - Decide about default values
  - Adjust mappings
  - ...

# Walkthrough using the mango dataset example: EcoSpold02 data set created in the ecoEditor

Name

 mango production LK, 2016 - 2016\_created during the course.spold

```
2 <ecoSpold xmlns="http://www.EcoInvent.org/EcoSpold02">CRLF
3 <activityDataset>CRLF
4 <activityDescription>CRLF
5 <activity id="1a091cc1-8544-4509-92f7-0c8b59d04d82" activityNameId="b606483a-3de2-4599-85e8-eb065d97c756" inheritance
  type="1" specialActivityType="0">CRLF
6 <activityName xml:lang="en">mango production</activityName>CRLF
7 <includedActivitiesStart xml:lang="en">from preparing the field</includedActivitiesStart>CRLF
8 <includedActivitiesEnd xml:lang="en">with harvesting the mangos</includedActivitiesEnd>CRLF
9 <generalComment>CRLF
10 <text xml:lang="en" index="1">This dataset refers to the production of Mango in Sri Lanka.</text>CRLF
11 </generalComment>CRLF
12 </activity>CRLF
13 <geography geographyId="0c13823c-7d7e-11de-9ae2-0019e336be3a">CRLF
14 <shortname xml:lang="en">LK</shortname>CRLF
15 </geography>CRLF
16 <technology technologyLevel="3" />CRLF
17 <timePeriod startDate="2016-01-01" endDate="2016-12-31" isDataValidForEntirePeriod="true" />CRLF
18 <macroEconomicScenario macroEconomicScenarioId="d9f57f0a-a01f-42eb-a57b-8f18d6635801">CRLF
19 <name xml:lang="en">Business-as-Usual</name>CRLF
20 </macroEconomicScenario>CRLF
21 </activityDescription>CRLF
22 <flowData>CRLF
23 <intermediateExchange id="bc72e57d-5045-482f-85d6-066eaccfdcb8" unitId="487df68b-4994-4027-8fdc-a4dc298257b7" amount=
  intermediateExchangeId="1c819f15-1202-4fa9-8ef9-72196c2dfb85">CRLF
24 <name xml:lang="en">apple</name>CRLF
25 <unitName xml:lang="en">kg</unitName>CRLF
26 <property propertyId="6d9e1462-80e3-4f10-b3f4-71febd6f1168" amount="0.83" unitId="487df68b-4994-4027-8fdc-a4dc29825
27 <name xml:lang="en">water in wet mass</name>CRLF
28 </unitName xml:lang="en">kg</unitName></property>CRLF
```

# Walkthrough using the mango example: Import EcoSpold02 data set in the ecoEditor to openLCA

The screenshot displays the openLCA software interface. The top menu bar includes 'Welcome', 'P mango production - LK', '\*mango production', and 'Analysis result of mango production'. Below the menu bar, the 'Product system statistics' section is active. It contains a 'General statistics:' table with the following data:

Statistic	Value
Number of processes	9920
Number of process links	92696
Connected graph / can calculate?	yes
Technology matrix	9919 x 9919
Reference process	mango production

Below the table is a 'Recalculate' button. Underneath, the 'Processes with highest in-degree (linked inputs):' section is shown. It contains a table with the following data:

Process	Number of input links
market for electricity, high voltage   electricity, high voltage   cut-off, U	249
market for heat, district or industrial, other than natural gas   heat, district or industrial, other than natural gas   cut-off, U	153
market for heat, district or industrial, other than natural gas   heat, district or industrial, other than natural gas   cut-off, U	122
pesticide production, unspecified   pesticide, unspecified   cut-off, U	112
pesticide production, unspecified   pesticide, unspecified   cut-off, U	101

# Walkthrough using the mango example: Imported EcoSpold02 dataset in openLCA

[Welcome](#) | 
 [P mango production - LK](#) | 
 [\\*mango production](#) | 
 [Analysis result of mango production](#)

## Contribution tree

☐ Flow Manganese - Emission to air/low population density  
☒ Impact category Ecosystems-total  
☐ Cost category Added value

Contribution	Process
100.00%	mango production - LK
72.73%	market for irrigation   irrigation   cut-off, U - CN
72.73%	irrigation   irrigation   cut-off, U - CN
36.65%	market for shed   shed   cut-off, U - GLO
36.34%	shed construction   shed   cut-off, U - RoW
34.43%	market for sawnwood, softwood, dried (u=20%), planed   sawnwood, softwood, dried (u=20%), planed   cut-off, U - Ro...
34.43%	sawnwood production, softwood, dried (u=20%), planed   sawnwood, softwood, dried (u=20%), planed   cut-off, U - R...
11.60%	market for sawnwood, board, softwood, dried (u=20%), planed   sawnwood, board, softwood, dried (u=20%), planed   ...
10.72%	planing, board, softwood, u=20%   sawnwood, board, softwood, dried (u=20%), planed   cut-off, U - CA-QC
00.87%	planing, board, softwood, u=20%   sawnwood, board, softwood, dried (u=20%), planed   cut-off, U - RoW
00.00%	market for transport, freight, lorry, unspecified   transport, freight, lorry, unspecified   cut-off, U - GLO
00.00%	planing, board, softwood, u=20%   sawnwood, board, softwood, dried (u=20%), planed   cut-off, U - CH
00.00%	market for transport, freight, light commercial vehicle   transport, freight, light commercial vehicle   cut-off, U - GLO
00.00%	market group for transport, freight train   transport, freight train   cut-off, U - GLO
00.00%	market for transport, freight, sea, transoceanic ship   transport, freight, sea, transoceanic ship   cut-off, U - GLO
11.48%	market for sawnwood, softwood, dried (u=20%), planed   sawnwood, softwood, dried (u=20%), planed   cut-off, U - Ro...

# Capstone User Exercise

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A user exercise can be done if you have or acquire certain tools<sup>(a)</sup>:

- the ecoEditor from ecoinvent (<http://www.ecoinvent.org/data-provider/data-provider-toolkit/ecoeditor/ecoeditor.html>)
- and openLCA from GreenDelta (<http://www.openlca.org/>)

## Exercise:

1. Load the mango dataset into ecoEditor (or even better use ecoEditor to build one of your own datasets)
2. Import the test dataset from ecoEditor into openLCA
3. Connect and build a complete life cycle, and calculate results in openLCA.

<sup>(a)</sup> The LCA Databases Helpdesk does not endorse these tools, but simply identifies them as development capabilities and learning resources.

# For helpdesk assistance –

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- Become a Helpdesk member:
  - To access the Helpdesk exchange space (or any other Clearinghouse area), you will need to create an account in the Clearinghouse ([www.scpclearinghouse.org](http://www.scpclearinghouse.org)).
  - Toward the bottom of the homepage you will see a button labeled 'Join the Community now'. Click on this link and open a form to allow you to create a login and profile.
  - Once logged in, you can modify or update your profile or explore the various SCP topic areas.
  - Go to 'About' and then to 'Exchange Spaces' where you will see Lifecycle Approaches in the drop down menu and one menu level below that is the Technical Helpdesk.
  - The Technical Helpdesk space will be available to any visitor, logged in or not. Without being logged in and joining the helpdesk space, any visitor can look at the various sections of the helpdesk space, but cannot contribute any content.
  - In order to become a member of the helpdesk space, on the homepage under the summary, is "Request space membership". Click here, you will automatically be given rights of a members to contribute content, since it is a public group.
  - For your next login, you go directly to <http://spaces.scpclearinghouse.org/> and then choose the Technical Helpdesk space in the dropdown list.
- Helpdesk Manager - Bruce Vigon, Consultant to SETAC,
- Helpdesk Coordinator – Kristina Bowers, UN Environment, Economy Division