Sustainable Recycling Industries
Component A: Life Cycle Inventories

Invitation to tender for LCI data collection and submission to ecoinvent Centre

November 2016
Call for Tenders

for Life Cycle Inventory (LCI) data collection, LCI dataset creation and submission to ecoinvent

This is an open invitation for tender.

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1. Background & project description

ecoinvent is the world’s leading supplier of consistent and transparent LCI data of renowned quality. ecoinvent is a proud partner of the Sustainable Recycling Industries (SRI) programme, a programme funded by the Swiss State Secretariat for Economic Affairs (SECO) and jointly implemented by the Swiss Institute for Materials Science & Technology (Empa), the World Resources Forum (WRF) and ecoinvent, through three interconnected programme components:

- Component A - Life Cycle Inventories: SRI gathers and provides local LCI data for the assessment of agricultural and industrial activities through the enhancement of local and regional LCA expertise with the aim to provide freely available regionalized LCI data for India, Latin America, and South Africa.

- Component B - Recycling Initiatives: SRI improves local capacity for sustainable recycling activities together with private and public institutions, as well as the informal sector in a number of partner countries (Peru, Colombia, Ghana, Egypt, India)

- Component C - SRI Roundtable: SRI facilitates a stakeholder consultation for the development of sustainability criteria for secondary raw materials

ecoinvent is in charge of component A of the SRI project.

Through this call ecoinvent aims to subcontract the task of LCI data collection, dataset creation and submission to the ecoinvent database.

2. Eligibility Criteria

Proposals can be submitted by public and/or private entities which are eligible according to their respective national/regional regulations, such as, but not limited to higher education institutions, public research institutes, private research institutes, companies, etc.

Tender shall come from an institution based in South Africa, or a partnership of institutions (consortium) from South Africa. The number of project partners should be reasonably balanced to correspond to the aims, duration and deliverables of the project.

No subcontracting of tasks to external institutions is permitted.

3. Task description

The tender shall provide LCI data to update existing datasets and/or provide new LCI datasets related to the primary production of metals in South Africa, including all the different treatment steps from the mining up to the refining. The tender shall submit the updated/constructed datasets to ecoinvent through appropriate means as explained in this call for tender.
All the datasets shall be created in accordance with the ecoinvent Data Quality Guidelines as well as the generic LCI modelling framework for primary production of metals, developed by Empa in the framework of an on-going Bafu\(^1\)-funded project. This developed framework aims (i) to be easily adaptable and applicable for all metal production situations, (ii) to ensure that datasets duly reflect the interconnectivity of metal production, i.e. ensuring the recovery and production of ‘companion metals’ is connected to the production of ‘host metals’ and (iii) also to ensure that metal production activities are modelled for all regions and metals in a consistent and comparable way. The basic structure of the framework is presented in Figure 1 on the next page. The framework covers the four primary production process stages, represented in the figure by different coloured boxes: mining (orange), concentration (green), extraction (purple), and refinement (blue). Each of these stages can be further broken down into sub-processes (e.g. for concentration: comminution, particle selection, and dewatering).

Appendix B lists the metals for which activity data from South Africa are of particular interest and that should be covered by the tender. The minimum LCI dataset requirements for each of the four processing stages are also presented. These requirements are based on the global share of mined and/or refined metal production from South Africa. In the case of services and infrastructures related to the primary production of metals (e.g. infrastructure construction, machinery operation, and services such as metal rolling), the data provider is entitled to generate a country-specific copy of the existing global (GLO) data (if available), otherwise new GLO dataset in addition to regional or country-specific datasets will need to be created. Additionally, the tenderer(s) shall provide the information to create and/or update the market activity datasets for primary and intermediate metal products and their linking to/from the transforming activity datasets. This will require information on (inter alia) average transportation distances, stockpiling, and trade losses.

In the framework of this project, the tenderer shall collect LCI data as well as information necessary for allocation, construct datasets in the form of unallocated unit process (UPR) activities, validate the constructed datasets to ensure consistency and compliancy with the ecoinvent version 3 quality guidelines, as well as document these datasets. In order to ensure consistency between data providers, data shall be entered by the tenderer in close coordination and according to the instructions provided by Empa. Once submitted, the tenderer shall apply the corrections required by editors and reviewers organized by ecoinvent until the acceptance of the datasets by the ecoinvent in the form of publication in a release of the ecoinvent database.

The data provider shall report to and collaborate with Empa, the ecoinvent management and respective editors during different phases of the project.

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\(^1\) Bafu: Swiss Federal Office of the Environment (Bundesamt für Umwelt)
Figure 1  Schematic of the LCI modelling framework for the primary production of metals.
A more detailed task description includes:

a. *Data collection*
   - Acquiring data, which are needed for the creation of datasets in the form of unallocated unit process activity (UPR), through appropriate and coherent means, such as field measurements, interviews, questionnaires, literature research, estimations as well as calculations, for the primary production of those metals listed in Table B.1.
   
The data represents the information required to create transforming datasets\(^2\) (LCI data), as well as Market datasets. The data collection project has to be carried out in alignment with Data Quality Guidelines for the ecoinvent database version 3 as well as the specific requirements for the modelling of primary metals production chains according to Empa.

b. *LCI datasets creation and entry to ecoEditor*
   - Using the collected data, construct datasets in the form of UPR activities or update the existing datasets in ecoinvent. More specifically, the tenderer(s) shall
     - Update the existing dataset in ecoinvent database related to primary metals production in South Africa, with more recent and regionalized data/information on key process parameters and emissions from sites operating in the region. Adaptation to the specific requirements according to the new, generic modelling approach developed by Empa. The list of related existing datasets in ecoinvent database is provided in Table B.2 of Appendix B.
     - Provide new datasets representing the production (i.e. mining, concentrating, extracting, refining, and the related transportation efforts) of all further, in Table B.1 listed (primary) metals in South Africa.
     - Provide the information to create and update the Market datasets for the supply and distribution of the in Appendix B listed metals in South Africa, namely information on average transportation distances, warehousing, transportation, and trade losses.
   - The dataset creation has to conform to the instructions provided in the ecoinvent Data Quality Guidelines of version 3 and the submitted datasets shall integrate with and build on top of the existing ecoinvent database.
   - The structure of the submitted datasets shall conform to the generic structure for Life Cycle Inventories of the primary production of critical and scarce metals in version 3 of the ecoinvent database, developed by Empa in framework of a Bafu-funded project\(^3\).

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\(^2\) A market dataset collects all activities with the same reference product in a certain geographical region. Furthermore, it includes average transports of that product within the geography, as well as inputs of the product itself to cover losses in trade and transport. In other words, they are consumption mixes of a certain product in a certain geographical region. For more information on Market datasets and other types of datasets in ecoinvent, please refer to Data Quality Guidelines for the ecoinvent database version 3.

\(^3\) For more information on the generic structure for the primary production of critical and scarce metals, please refer to the following document:
- Enter the created datasets in the ecoEditor tool, i.e. the tool to create, edit, review and upload datasets for the ecoinvent database, to create LCI datasets in ecoSpold 2 format. The software "ecoEditor for ecoinvent version 3" is free to use and can be downloaded from the ecoinvent website.

c. **Datasets validation: compliancy and consistency**
- Run the off-line and on-line validation checks of datasets created in ecoEditor software, using the respective functions of the software, according to the instructions provided in chapter 12 (Validation and review) of Data Quality Guidelines of ecoinvent version 3.
- Perform an internal review of the created datasets to ensure comprehensiveness, adherence to the quality guidelines (compliancy with ecoinvent version 3), consistency with similar activities in other geographies or using similar technologies, and to eliminate data entry errors.

d. **LCI datasets documentation**
- Document the datasets to be compliant with the ecoinvent “good practice for documentation”, as described in section 7 of the Data Quality Guidelines for the ecoinvent database version 3.

e. **LCI dataset submission and integration into ecoinvent database**
- Gather the necessary information for submission according to the Data Quality Guidelines of ecoinvent database version 3, and submit the UPR datasets to ecoinvent by using the ecoEditor. The submission process has to be done according to the procedure detailed in Data Quality Guidelines of ecoinvent database version 3.
- Upon receiving the feedback from the ecoinvent editors as well as its external and the technical reviewers, apply for the corrections required by the editors until the final acceptance of the datasets by the ecoinvent. This is an iterative process, and it is concluded when Life Cycle Impact Assessment (LCIA) results are checked and approved by the data provider as well as ecoinvent and the datasets are published in a release of the ecoinvent database.

4. **List of deliverables**

A. A set of LCI datasets, in UPR format, which has been constructed, documented and reviewed according to the quality requirements of ecoinvent version 3, submitted to ecoinvent, and passed the review and validation phase of ecoinvent management and its editors to be published in a release of the ecoinvent database. The datasets shall conform to the scope as listed in Table B.1 in the Appendix.

Turner D., Haarman A. and Hischier R. (2016) Update and expansion of the life cycle inventories for the primary production of scarce and critical metals in the ecoinvent database. Project report of Phases I and II of the Bafu-funded project for an “update and expansion of the life cycle inventories for the primary production of scarce and critical metals in the ecoinvent database”. For an electronic copy, please contact roland.hischier@empa.ch.
B. Information required to create upstream (downstream) Market datasets which supply (receive output from) the above datasets
The datasets and the related documentation shall be provided in English language.

5. Support during project implementation

Ecoinvent management and its editors, who will be selected based on the type and sector of the LCI data, will provide support and guidance to a certain extent during different phases of data collection, dataset creation, review and submission processes. Table 2 demonstrates the supporting role of ecoinvent management and its editors in different phases of data collection and submission to ecoinvent.

Table 2: Supporting role of Empa and ecoinvent centre during different phases of data submission

<table>
<thead>
<tr>
<th>Data provider</th>
<th>Empa</th>
<th>ecoinvent</th>
<th>ecoinvent editors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Submission of the list of data to be collected and datasets to be developed</td>
<td>Metal-related coordination with other regions and/or metals</td>
<td>Identify and contact the responsible editor</td>
<td>--</td>
</tr>
<tr>
<td>Data collection</td>
<td>Metal-specific guidance during data collection and modelling</td>
<td>General guidance during the data collection and modelling</td>
<td></td>
</tr>
<tr>
<td>Dataset creation, entry into ecoEditor, and datasets validation</td>
<td>Metal-related, specific guidance during dataset creation (to ensure the coherence with data from other regions ...)</td>
<td>Guidance during the dataset creation in the ecoEditor and datasets review</td>
<td>--</td>
</tr>
<tr>
<td>Submission of datasets into review</td>
<td>--</td>
<td>Guidance during the dataset submission</td>
<td>Start reviewing the dataset, enter notes on what shall be corrected</td>
</tr>
<tr>
<td>Final submission of datasets following the review of ecoinvent</td>
<td>--</td>
<td>Approval of the dataset</td>
<td></td>
</tr>
<tr>
<td>Checking and Approving the LCIA results after integration of the datasets into the working version of ecoinvent database</td>
<td>--</td>
<td>Upload the datasets to ecoinvent database and extract and send out the LCIA results to the data provider</td>
<td>Approval of LCIA results</td>
</tr>
</tbody>
</table>
6. Reporting procedure

The project implementer shall report to Empa and ecoinvent, through appropriate means such as telephone conversation or written documents, the status and progress of the project according to the original plan of action submitted along with the proposal.

7. Transfer of rights and acknowledgements

During the data submission process, data providers shall grant ecoinvent the non-exclusive right to use the datasets. All copyrights to the submitted data remain with the authors of the dataset. The exact text of this agreement follows:

"I confirm to hold the copyright to the uploaded data and to be entitled to dispose of these copyrights. I hereby transfer the non-exclusive right of use of the uploaded data to the ecoinvent Centre for publication in the ecoinvent database, including but not limited to the right to publish, republish, transmit, sell, distribute, modify, change, complete and otherwise use the contributed dataset in electronic and print form and in derivative works throughout the world, in all languages, and to license or permit others to do so. This transfer of non-exclusive right of use cannot be withdrawn without a full payment of compensation to the ecoinvent Center to cover damages or a replacement of the withdrawn data. I maintain the right to use the transferred data for my own scientific work as well as to use it with third parties on a non-exclusive basis, including for commercial purposes."

In addition, the funding and supporting institutions in collecting the LCI data and preparing the datasets shall be acknowledged.

8. Schedule and timeframe

It is considered as a bonus (see evaluation criteria) if the data collection and submission can be committed to be finalized within 9 months since the start of the project. The tenderers shall provide a precise schedule according to which they would start and finalize each of the tasks described in the “Task Description” section of this call for tender.

Within one month of the start of the project, the data provider shall submit, in close collaboration with Empa (taking into account the generic modelling approach for primary
production of metals) to ecoinvent the updated list of data to be collected and datasets to be developed. This list shall include all the datasets included in the original proposal for the call for tender, as well as any related datasets that will be required to be submitted along with the datasets in the proposal, in order to make the submission version 3-compliant.

Furthermore, early commencement of datasets submission to ecoinvent—e.g. within three months of the start of the project—to allow for a prompt review procedure by the ecoinvent centre and its reviewers, is highly valued.

9. Budget

The funding ceiling to carry out the subcontracted tasks is limited to a total of CHF 40’000 (fourty thousand Swiss Francs), including any applicable VAT. The budget shall include all costs, including personnel and operational costs to carry out the project. The contract will be issued in CHF.

10. Application

Interested tenderer(s) shall provide a list of LCI datasets they propose to submit—accompanied by a short description of the main features/contents of datasets and their coherence with the generic modelling framework of Empa for the primary production of metals—as well as the estimated time (in terms of hours) to create and submit each batch of datasets. The tenderers shall also indicate in the proposal the different proposed activities to realize the aims of this tender, namely the methodology/strategy employed to collect LCI data for updating/creating the submitted datasets. Such information shall be provided to ecoinvent by filling-in the Table A.1 provided in the Appendix A of this call for tender.

The tenderers shall also indicate in the proposal the required budget to carry out the LCI data collection and delivery.

In addition, the tenderer(s) must demonstrate that they possess the resources and thus are competitive enough to fulfil the aforementioned project. The tenders shall provide the name and CV of all the key persons who will participate in different tasks of the data collection project, along with their expertise level, estimated time devoted to the project, and their respective charging fee (per day).

It is considered a bonus the tender offers to complete the project within less than 9 months of the start of the project, and an extra bonus if tenderer’s offer is significantly below the budget ceiling (40’000 CHF).

11. Evaluation

Step 1: Eligibility validation
Ecoinvent will assess the eligibility of the received proposals according to the following criteria:

- applying institution and composition of the consortiums (institution or consortium of institutions from South Africa).
- all required information is correctly provided
Step 2: Assessment

The assessment to select the project partner(s) will be based on the following criteria:

*Expertise and experience of the institution or combination of institutions (50%)*

- demonstrated knowledge and expertise in the sector detailed in Table 1 of this call for tender (Min=1, Max=15)
- experience in LCA and in LCI data collection activities, specifically related to the metals sector (mining, refining of primary metals) (Min=1, Max=10)
- experience in working with ecoinvent version 3, the LCI data preparation to create LCI datasets according to ecoinvent Data Quality Guidelines v3, and the submission process to ecoinvent version 3, using the ecoEditor tool (Min=1, Max=5)

*List and quality of proposed deliverables (50%)*

- type, quality, and quantity of the LCI data the tender would commit to submit to ecoinvent database, which shall be related to the primary production of the metals listed in Appendix B (Min=1, Max=10)
- a timetable that presents the plan according to which the tender intends to deliver each type of dataset (or batch of datasets), with speedier delivery being considered a bonus (Min=1, Max=5)
- integratibility of the LCI data/datasets with the existing structure and data in the ecoinvent database (Min=1, Max=10)
- required budget to carry out the proposed project, with offers significantly below the maximum offer (40’000 CHF) being rewarded extra points up to the maximum for free offers (Min=1, Max=5)

12. Question and answer period

A question and answer period is envisaged for interested parties to submit questions related to the preparation and submission of the full proposal. All such inquiries and technical questions shall be directed to Amir Safaei via email: safaei@ecoinvent.org. Deadline to register questions is 9th of December 2016.

13. Closing date for proposal submissions

19th of December 2016
14. Submission procedure

Tenderers shall submit tenders by email to safaei@ecoinvent.org before the closing date for proposal submission indicated above.

The evaluation will be performed within three weeks of the deadline for tender and the bidders will be informed immediately. The draft contract will be issued within 2 weeks after the selection of the successful bidder and work has to start within one week after the signature of the contract. In case of any questions, please contact Amir Safaei at safaei@ecoinvent.org.
Appendix A
Scope of the data call: list of datasets

Table A. 1: Proposed dataset submission template (includes example data that can be discarded)

<table>
<thead>
<tr>
<th>Process (activity) name</th>
<th>Number/detail of related UPRs</th>
<th>Hours required to gather/submit data</th>
<th>Proposed delivery date</th>
<th>Similar existing global datasets in ecoinvent (if any)</th>
</tr>
</thead>
</table>
| Soybean production     | 4 regions, plus required datasets on deforestation and land transformation, as well as 4 datasets for organic fertilizer not present in ecoinvent so far, plus 1 irrigation dataset for India adapted from existing ecoinvent data | 48 | 4 months after contract signature | - Soybean production  
- Soybean production, on land recently transformed |
| Chicken production     | 1 dataset on chicken production, 1 dataset on feed | 6 | 4 months after contract signature | |
| Cement production      | 4 states in India, plus required datasets (8 total) on upstream processes of clinker production | 20 | 4.5 months after contract signature | - Cement production, Portland, CH 2010 |
Appendix B

Scope of the data call: list of LCI datasets

<table>
<thead>
<tr>
<th>Metal</th>
<th>Priority</th>
<th>Minimum number of datasets required</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mining</td>
</tr>
<tr>
<td>Antimony</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Cobalt</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Gold</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Lead</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Nickel</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Palladium</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Platinum</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Rhodium</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Ruthenium</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Iridium</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Osmium</td>
<td>1st</td>
<td>X</td>
</tr>
<tr>
<td>Hafnium</td>
<td>2nd</td>
<td>X</td>
</tr>
<tr>
<td>Titanium</td>
<td>2nd</td>
<td>X</td>
</tr>
<tr>
<td>Zirconium</td>
<td>2nd</td>
<td>X</td>
</tr>
<tr>
<td>Vanadium</td>
<td>2nd</td>
<td>X</td>
</tr>
<tr>
<td>Chromium</td>
<td>3rd</td>
<td>X</td>
</tr>
<tr>
<td>Silicon</td>
<td>3rd</td>
<td>X</td>
</tr>
</tbody>
</table>
For each metal, LCI datasets that are required as a minimum for different primary production process stages is presented (‘X’ symbolise datasets that are required whereas ‘O’ symbolise datasets that are required only if such production activity occurs in the country).

Table B.2 List of existing related datasets in ecoinvent database

<table>
<thead>
<tr>
<th>Dataset</th>
</tr>
</thead>
<tbody>
<tr>
<td>platinum group metal mine operation, ore with high rhodium content, ZA</td>
</tr>
<tr>
<td>gold production, ZA</td>
</tr>
</tbody>
</table>