

**Appendix A**  
**Statement of Work**  
**Life Cycle Inventory database maintenance, updates and coordination**  
**with the Federal Data Commons**  
**1/9/17**

**1.0 Background**

The National Renewable Energy Laboratory (NREL) conducts a diverse range of energy analyses to increase understanding of the current and future interactions and roles of energy policies, markets, resources, technologies, environmental impacts, and infrastructure. These analyses help NREL/DOE to make informed decisions as energy-efficient and renewable energy technologies advance from conceptual to commercial application. The NREL Energy Analysis division also supports the Office of Energy Efficiency and Renewable Energy (EERE) by conducting analysis related to a number of Research, Development and Deployment (RD&D) programs and in support of portfolio decision-making.

**2.0 Objective**

NREL manages the U.S. Life Cycle Inventory (USLCI) Database (<https://uslci.lcacommons.gov/uslci/search>, <http://www.nrel.gov/lci/about.html>), which serves as the repository for life cycle inventory (LCI) data representative of U.S. base processes and products. LCA data funded and developed by NREL and federal agencies is valued by researchers and LCA practitioners as being reliable, complete, transparent and comprehensive. The Federal LCA Data Commons (referred hereafter as LCA Commons) (<https://www.lcacommons.gov/>) is an inter-agency effort leveraging the existing expertise of the participants, defining a sustainable model for reducing costs, and improving conformity amongst federal agencies working in the life cycle assessment (LCA) field. Collaboration with the LCA Commons effort supports the collection, availability and usability of federal agency LCA data.

LCA data is the baseline for much of the life cycle energy analysis work that is being done for the NREL and the DOE Advanced Manufacturing Office. Reliable process and life cycle oriented industry data are the building blocks for evaluating the industrial systems. The ability to evaluate the impacts of the industrial sector is highly dependent on the availability of this data. Some data is available in the USLCI database, developed and provided by industry and publicly available. The success of the LCA Commons can result in the availability of better data for use in NREL and DOE EERE analysis that are supported by more reliable data sources.

**3.0 Scope of Work**

The Subcontractor shall provide the following services and related deliverables.

- Support of  
Data Commons
- 3.1 The near term scope for the Federal LCA Data Commons is to establish common data conventions and data exchange functionality to the maximum extent possible given existing resources, and to establish a single portal for accessing federal LCI datasets. The long term vision is to leverage the success of this implementation to develop a single, consistent, and representative LCI data framework for the United States, and the organizational structure necessary to manage and maintain it. These pursuits will support a wider adoption of LCA for use by decision makers throughout NREL, the Federal government and industry

to achieve environmentally sustainable outcomes in response to the growing desire for sustainable growth within the United States.

The following features of the LCA Commons are proposed as ways to reduce costs of managing the above challenges:

- A single web application for finding and accessing LCI data from agencies across the federal government (including private industry and academia)
- Consistent nomenclature, metadata, documentation, and naming conventions
- Compatible file exchange formats or data templates
- Data and models that are interoperable, and machine readable
- A single "core" background dataset for energy, transportation, and materials.

The objectives for the LCA Commons are as follows:

- 1) Improve public access to LCI data developed by the Federal government,
  - 2) Improve consistency in nomenclature, organization, and documentation of LCI data developed within the Federal government, and
  - 3) Improve interagency communication and coordination of LCI data development practices within the Federal government.
- 3.2 The structure and evolution of the LCA commons requires that the USLCI be transitioned to be in alignment and connected with the LCA Commons.
- 3.3 The USLCI database has undergone a transition phase. The collaboration with the LCA Commons and the adoption of the open LCA platform utilized by the LCA commons has resulted in some new requirements for data providers. An updated data submission guidelines document is required for data providers to help them understand the new data requirements and the options for submitting data in different formats.
- 3.4 Data providers are continuing to submit data to the USLCI database. The Subcontractor shall coordinate with and provide guidance to the data providers, review the data to ensure that it is complete, is in the correct format and meets the requirements to be submitted to the LCA Commons.
- 3.5 The LCA Commons is looking to be a central repository for U.S. federally funded life cycle inventory data. This data can be the backbone of analysis done both in the public and private sector. Much of this data is being utilized in DOE life cycle energy analysis across different technologies of interest.

Where is USDA  
wh/ can be done  
wh/ is t/ roadmap  
wh/ we can do now

Dataset Review

#### 4.0 Tasks

The Subcontractor shall work with federal agencies collaborating in the federal data commons to ensure the most current and complete and robust data is available in a consistent, connected, reliable and usable format, which will be determined by the NREL Technical Monitor (TM). The Subcontractor shall complete the following tasks:

- 4.1 **Alignment of USLCI with LCA Commons.**  
The structure and evolution of the LCA Commons requires that the USLCI database be transitioned from its current structure and format in order to be in

Data Submission  
Guidance

- Jonathan started
- Needs more details
- Specific V-list

In-House  
check-list

The following deliverables shall be provided by the Subcontractor in support of this work effort:

Deliverable	Task	Deliverable	Time After Contract Execution
1	4.1	USLCI / Federal LCA Data Commons management document - DRAFT	2 months after contract execution
2	4.1	USLCI / Federal LCA Data Commons management document - FINAL	3 months after contract execution
3	4.2	Data development and submittal guidance document - DRAFT	3 months after contract execution
4	4.2	Data development and submittal guidance document - FINAL	4 months after contract execution
5	4.3	LCI data review - Final datasets submitted to the data commons for publishing on the database	As needed
6	4.4	Federal Data Commons Coordination report - DRAFT	6 months after contract execution
7	4.4	Federal Data Commons Coordination report - FINAL	8 month after contract execution

□ Proposal in couple weeks

□ Develop in parallel

425

300

500

400

1625

#### DELIVERY OF COMPUTER SOFTWARE CODE (AS APPLICABLE)

All object, source, or other code (including all applicable data sets) developed under this subcontract effort shall be provided to the technical monitor as a condition of final payment, in accordance with the subcontract. It is expected that all delivered source code shall be original and the subcontractor shall provide a written certification to the subcontract associate that all source, or other code developed and delivered under this subcontract does not contain any open source code - as a condition of final payment in accordance with the subcontract. The subcontractor's (including all lower tier subcontractors, as applicable) certification shall specify that "All source, or other software code developed and/or delivered under this Subcontract No. \_\_\_\_\_ is original and does not contain any 3<sup>rd</sup> party or other open source software."

16m → 102.6 hr/who  
5 hr/day  
≈ 1/2 time

#### **7.0 ELECTRONIC REPORTING REQUIREMENTS FOR SUBCONTRACT REPORT DELIVERABLES**

It is NREL's intention to publish subcontract report deliverables containing publicly available information (e.g. non-confidential, non-protected, non-proprietary information) for distribution on the internet.

The subcontractor shall provide the final approved version of report deliverables in accordance with the electronic reporting requirements described below.

alignment and connected with the LCA Commons. The Subcontractor shall provide technical support to ensure that the USLCI database is aligned with the rest of the LCA Commons. The Subcontractor shall provide documentation detailing the requirements for the LCA Commons and how the USLCI database will be managed to meet those requirements and the necessary tools for that management. The Subcontractor shall also organize a system for the in-house management of the USLCI database that is in alignment with the LCA Commons. A draft version of the management document will be submitted to the NREL TM for review. A final version of the management document will incorporate the TM's feedback and shall be submitted to NREL.

External check - 4.2

**4.2 Develop a data development and submittal guidance document.**

The Subcontractor shall develop a data development and submittal guidance document to help data providers understand the requirements and different format options for submission of data to the USLCI database in the LCA Commons platform. These guidelines should inform data providers on the specifics of what information is required, and how to submit the data from different software platforms. These submissions should be in accordance with the LCA commons requirements. A draft version of the data development and submittal guidance document will be submitted to the NREL TM for review. A final version of the data development and submittal guidance document will incorporate the TM's feedback and shall be submitted to NREL.

**4.3 Provide data review for life cycle inventory datasets submitted to the USLCI database.**

Data providers are continuing to submit data to the USLCI database. The Subcontractor shall coordinate with the data providers, review the data to ensure that it is complete and in the correct. The Subcontractor shall review approximately 20 data sets, format them and submit them to the LCA Commons.

**4.4 Develop LCA Commons Coordination report.**

The Subcontractor shall develop a summary report on the status of the LCA Commons as well as the challenges and benefits to federal agencies and the general public. The report should also include areas of opportunity where the Federal Data Commons can support the goals and objectives of the different EERE Offices. A draft coordination report shall be submitted to the NREL TM for review. A final coordination report will incorporate the TM's feedback and shall be submitted to NREL.

**5.0 REVIEW MEETINGS AND TRAVEL REQUIREMENTS**

Subcontractor will have one person attend and present work at the annual American Center for Life Cycle Assessment (ACLCA) conference. This will serve as an opportunity to present the work to a broad audience of users and to meet with the LCA Commons collaborators for a review meeting. The conference is scheduled for October 3-5, 2017 in Portsmouth, NH.

**6.0 Deliverables**

The technical monitor may specifically direct the subcontractor to provide reports in one or more of the file format standards provided below.

- a. The subcontractor shall submit all report deliverables (including status, annual, or final reports) as electronic files in Adobe .pdf format, preferably with all graphics and images embedded within the document.
- b. All final approved version submissions shall be delivered to NREL via e-mail to the 1) NREL Technical Monitor, 2) the NREL Subcontract Administrator or Associate (as specified in the Deliverable Addresses below).
- c. If it is not possible to include all of the graphics and images (figures, illustrations, and photographs) in the same file as the text, NREL will accept the text in Adobe .pdf formats and the graphics and images as separate electronic graphic or image files\*. The accepted standard for page layout and graphics is the Adobe Creative Suite of programs.

\*The acceptable graphic or image file formats are: .eps, .tif, .gif, .jpg, .wmf, .emf, .pct, .png, .bmp, .psd, .ai, .fh, .qif, .fpx, .cdr. The preferred resolution for graphics or images is 300 dpi. Include all fonts used in creating the file.

- d. For animation, video, or multi-media elements, CD-ROM, DVR and thumb drive are acceptable technical deliverable media.
- e. For all calculations in support of subcontract reports that are conducted in ASPEN+, an electronic copy of INPUT, REPORT and BACKUP (if Model Manager is used) must be submitted with all reports. Additionally, if costing or sizing calculations are conducted in a spreadsheet [no process calculations (heat and material balances) in spreadsheet format are permitted], a copy of the fully documented MS Excel file shall be supplied.
- f. A fully executed model release shall be supplied to NREL with all photographs and images, regardless of whether such photographs or images are delivered to NREL electronically or in hard copy. Such model release shall certify that the Alliance for Sustainable Energy, LLC, Management and Operating Contractor for the National Renewable Energy Laboratory for the U.S. Department of Energy is granted a non-exclusive, paid-up, irrevocable, worldwide license to publish such photographs in any medium or reproduce such photographs or allow others to do so for United States Government purposes. Model releases are required in all situations in which a reasonable person would respond in the affirmative to the question – could someone, other than the model himself/herself, recognize the person in this photograph or image? All model releases shall be provided to the subcontract associate as a condition of final payment, in accordance with the subcontract. To obtain a Subcontractor Model Release form, please contact [images@nrel.gov](mailto:images@nrel.gov).

## 8.0 ACKNOWLEDGEMENTS IN SUBCONTRACTOR PUBLICATIONS

In any scientific or technical report or article, conference paper, journal article, etc. based on or containing data first produced in the performance of this subcontract and published in academic, technical or professional journals, symposia proceedings or similar works, the subcontractor shall use this acknowledgement stating, "This [article, conference paper, journal article, etc.] was developed based upon funding from the Alliance for Sustainable Energy, LLC, Managing and Operating Contractor for the National Renewable Energy Laboratory for the U.S. Department of Energy."

## 9.0 COPYRIGHT PERMISSION/AUTHORIZATIONS

The subcontractor is responsible for obtaining copyright permissions and/or authorizations for all information and/or data, as applicable that is incorporated into all final technical reports. Electronic copies of these copyright permissions and/or authorizations shall be provided to the subcontract associate at the email address provided below. The subcontractor shall also provide a written certification to the subcontract associate as to such permissions and/or authorizations as a condition of final payment. The subcontractor's (including all lower tier subcontractors, as applicable) certification shall specify that "I have obtained all necessary and legally required copyright permissions and/or authorizations for any and all information, data, graphs, images, etc., as applicable, that is incorporated into the final Technical Report titled \_\_\_\_\_, delivered under this Subcontract No. \_\_\_\_\_. Copies of these permissions and/or authorizations are attached."

### Deliverable Addresses:

The subcontractor shall clearly label all deliverables to include:

- The subcontractor's name
- NREL's subcontract number
- NREL Technical Monitor's name
- Deliverable date, and
- Deliverable description.

Deliverables shall be sent via email to each of the following addresses:

- 1) Alberta Carpenter, Technical Monitor  
National Renewable Energy Laboratory  
15013 Denver West Parkway  
Golden, CO 80401  
e-mail: Alberta.Carpenter@nrel.gov
  - One (1) master electronic version, including graphics
- 2) Diane Cavaliere, Subcontract Associate  
National Renewable Energy Laboratory  
15013 Denver West Parkway  
Contracts and Business Services  
Golden, CO 80401  
e-mail: Diane.Cavaliere@nrel.gov
  - One (1) master electronic version, including graphics