Summary

The Center for Low Carbon Society Strategy (LCS) quantitatively evaluates various low carbon technologies under the Quantitative Technology Systems Research program (see, for example, LCS proposal papers (FY2014-PP-00(June, 2014)) and (FY2016-PP-00(December, 2016))). “Platform of Low Carbon Technologies for Process Design and Evaluation of Manufacturing Cost and CO_2 Emissions” (hereafter referred to as “platform”) is the information system infrastructure supporting this research (LCS proposal papers (FY2013-PP-07(March, 2014)) and (FY2014-PP-10(March 2015))). Using this “platform”, results of evaluation of important independent engineering systems may lead to suggestions for future policy.

To predict future performance and cost of low carbon technologies and propose the direction for future research and development, quantitative analysis of the hierarchical structure of those technologies is absolutely necessary. We have developed a “platform” to reduce the cost and time required for this quantitative analysis. In conjunction with the results calculated by the “platform” we have also developed a database support system to evaluate different technologies. Successive evaluation and sharing of information regarding low carbon technologies are necessary for improving performance and reducing cost.

In order to solve the above mentioned problems, the “platform” includes the following components developed until last year:

(1) A process simulator, named “Modeling Tool”, to determine material and energy balance.
(2) A CAD (computer-aided design and drafting) system to easily produce a BFD (Block Flow Diagram) and PFD (Process Flow Diagram) of the manufacturing process.
(3) A system which can easily use databases of production equipment cost, environmental loads, and price of raw materials.
(4) Database of standard modules of chemical engineering unit operations.

With respect to the above mentioned systems and databases, the following were achieved this fiscal year:

(1) Expansion of the application range of processes.
(2) Improvement of database contents.
(3) Improvement of system operability.

In order to support research of quantitative technology scenarios, we will be constantly upgrading this “platform”. Also, to formulate “a proposal concerning research and development targets and technical problems to be addressed, including the latest research and development trends”, we will be developing the following:

(1) System for supporting the reuse of innovative properties of this “platform”, i.e., similar instance retrieval.
(2) System for determining application fields for new radical technologies.
(3) Support system that can use the “Modeling Tool” not only as an “Analyzing Simulator” but also as a “Design Simulator”.