



MEMORANDUM OF UNDERSTANDING

Between

**THE UNITED STATES DEPARTMENT OF ENERGY
NATIONAL ENERGY TECHNOLOGY LABORATORY**

and

THE BRAZILIAN COAL ASSOCIATION

**CONCERNING COOPERATION IN CARBON CAPTURE AND CARBON
MANAGEMENT TECHNOLOGY DEVELOPMENT AND DEPLOYMENT**

**The United States Department of Energy National Energy Technology Laboratory (NETL)
and the Brazil Coal Association (BCA), herein the "Participants",**

**SHARING an interest in collaborating to advance technical, environmental, and cost
performance of fossil energy technologies,**

HAVE REACHED THE FOLLOWING UNDERSTANDING:

I. OBJECTIVE

The Participants intend to work together to develop the mechanisms and processes that will promote and sustain collaborative efforts for research and development (R&D) on base and enabling technologies, and assessments of technology options and economics.

II. AREAS OF COOPERATION

Topics of the Participants' proposed collaboration may include, but are not limited to, the following:

1. Development of clean coal technologies applicable to Brazilian coals, including integrated gasification combined cycle systems.
2. Development and assessment of sequestration options for carbon dioxide (CO₂) and other greenhouse gases from fossil fuel-based systems, including capture, storage, and utilization.
3. Development and assessment of technologies to recover coal bed and coal mine methane, including options to sequester CO₂ from fossil fuel-based systems.
4. Development and assessment of technologies for coal-to-liquids production.
5. Other environmental technologies for assessment, control, and remediation of ground water and soils, including acid mine drainage, affected by fossil fuel production and use.
6. Other related technologies, such as minimization and utilization technologies for wastes resulting from fossil fuel production and use (e.g., coal combustion byproducts).

Other areas of cooperation may be added by the Participants' mutual consent in writing.

III. FORMS OF COOPERATION

Cooperation may include, but is not limited to:

1. Exchange of information, publications, reports, technical data, samples, materials, and instruments.
2. Exchange of scientists, engineers and other specialists for participation in training, project definition activities, and energy analyses. Each Participant is to abide by health, safety, and environmental requirements of the host Participant when on an exchange assignment at the host Participant's facility.

3. Technical assistance in specific projects, such as the development of BCA's Clean Coal Technology Road Map and establishment of the Carbon Capture and Clean Coal Technology Center in Criciúma, Santa Catarina.
4. Planning of joint research projects in the Areas of Cooperation cited in Section II, such R&D to be undertaken pursuant to an appropriate written and executed contractual agreement.

IV. MECHANISMS OF COOPERATION

Each Participant should designate a lead coordinator to serve as that Participant's principal representative for all activities conducted under this Memorandum of Understanding (MOU), including identifying additional areas of cooperation, providing rapid response concerning its organization's interest in specific areas of cooperation, coordinating cooperation between the Participants, and identifying available resources (including funding) for collaborative activities under this MOU.

V. GENERAL CONSIDERATIONS

1. This MOU does not create any legally binding obligations between the Participants.
2. The conduct of cooperative activities contemplated by this MOU is subject to the availability of funding, personnel, and other resources.
3. Each Participant should conduct the cooperation under this MOU in accordance with applicable laws and regulations to which it is subject, and international agreements to which its Government is party.
4. Each Participant is to be responsible for the costs it incurs in participating in cooperative activities under this MOU.
5. Each Participant intends to retain its rights to its own background intellectual property. The Participants intend to determine the allocation of rights to newly generated intellectual property on a project-by-project basis.
6. This MOU supersedes and replaces the Memorandum of Understanding between the U.S. Department of Energy National Energy Technology Laboratory and The Brazilian Coal Association of November 28, 2007, as extended.

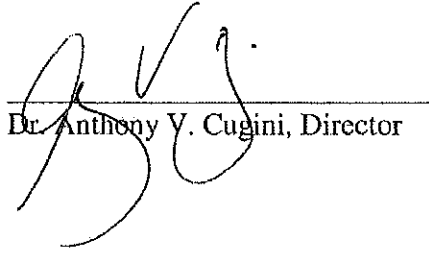
VI. COMMENCEMENT, MODIFICATION AND DISCONTINUATION

1. Cooperative activities under this MOU may commence upon signature by the Participants and continue for a 5-year period unless discontinued in accordance with paragraph 2 of this Section VI.

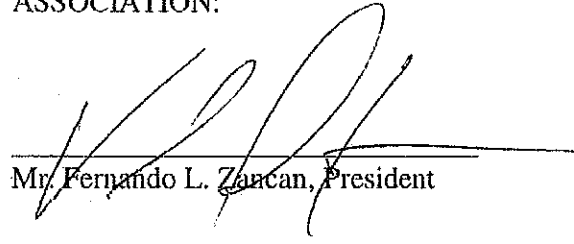
2. The Participants may discontinue this MOU at any time in writing. A Participant that wishes to discontinue its participation in this MOU should endeavor to provide at least ninety (90) days written notice to the other Participant.
3. This MOU may be modified in writing by mutual consent of the Participants, and may be extended for additional periods.

Signed at Florianópolis, in duplicate, this 6th day of June 2013.

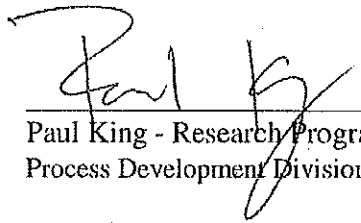
FOR THE UNITED STATES DEPARTMENT
OF ENERGY NATIONAL ENERGY
TECHNOLOGY LABORATORY:

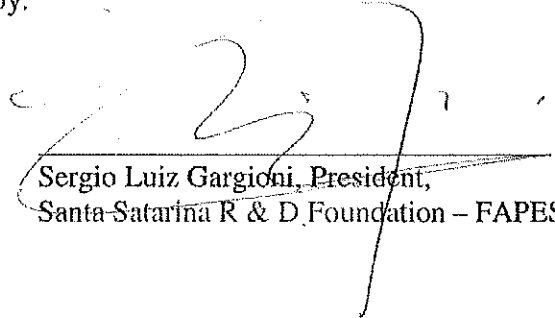

Dr. Anthony V. Cugini, Director

FOR THE BRAZILIAN COAL
ASSOCIATION:


Mr. Fernando L. Zancan, President

Witnessed by:


Paul King - Research Program Leader
Process Development Division


Sergio Luiz Gargioni, President,
Santa Catarina R & D Foundation - FAPES