

MEMORANDUM OF UNDERSTANDING
Between
CENTER FOR ADVANCED INTERDISCIPLINARY RESEARCH IN MATERIALS,
UNIVERSIDAD DE CHILE
And
UNIVERSITY OF CALIFORNIA, LAWRENCE BERKELEY
NATIONAL LABORATORY, SOLAR ENERGY RESEARCH CENTER,
MATERIALS SCIENCES DIVISION

This Memorandum of Understanding (MOU) is entered into between the Center for Advanced Interdisciplinary Research in Materials, Universidad de Chile (CIMAT) and the University of California, Lawrence Berkeley National Laboratory, Solar Energy Research Center, Materials Sciences Division, "LBNL" or "SERC."

RECITALS

WHEREAS, energy has become a pressing worldwide concern and, because of its lack of fossil fuel resources, energy access and energy security are particularly sensitive issues for Chile if Chile is to sustain continual economic growth;

WHEREAS, on June 12, 2008, the President of Chile, Her Excellency Michelle Bachlet, visited Lawrence Berkeley National Laboratory, together with members of her government, to attend an energy workshop;

WHEREAS, during the June 12, 2008 visit, links were established between Lawrence Berkeley National Laboratory and the Chilean Ministry of Foreign Affairs Division of Energy, Science, Technology and Innovation;

WHEREAS, on August 1, 2008, there was a follow-up visit to Lawrence Berkeley National Laboratory by members of the Center for Advance Interdisciplinary Research in Materials of the Facultad de Ciencias Físicas y Matemáticas of the Universidad de Chile, sponsored by Decyti; and

WHEREAS, during these visits the participants identified common interests and possible actions regarding energy, particularly the development of new solar energy technologies, as potential areas of collaboration within the framework of the State of California Chile-California plan for the XXI Century;

NOW, THEREFORE, based upon the above visits and discussions, the Parties hereto agree as follows:

INTRODUCTION

The Parties understand and confirm that this MOU does not create any legally binding obligations between them but serves only as a record of their intentions to identify areas of potential research collaboration in renewable energy materials with a strong focus on solar energy conversion. In addition, it is understood that Lawrence Berkeley National Laboratory is a Federally Funded Research and Development Center (FFRDC) that is

operated by The Regents of the University of California (UC) for the United States Department of Energy (DOE) pursuant to a written contract; and, therefore, all activities by LBNL/SERC under this MOU are required to comply with the terms and conditions of said contract.

BACKGROUND

Chile has two unique assets for solar energy conversion. The Atacama Desert, which ranks among the highest in the world in terms of solar intensity (250-300W/m²), receives an average of 8 hours of sunlight daily on approximately 180,000 Km² of desert area. A 10% efficient solar energy conversion system with 1% coverage would yield 14 Giga Watts of power. Additionally, the establishment of such a large scale solar energy conversion infrastructure will require abundant and cheap raw materials. Market analyses at LBNL's Solar Energy Research Center indicates that iron and copper based raw materials are the most likely candidates in this regard. Therefore, new materials for solar energy are likely to involve copper, leading to a significant expansion of the market for copper. Chile is ideally positioned to take advantage of this opportunity since it has the largest copper reserves in the world.

LBNL is the premier institution worldwide for energy research and development with an annual investment of more than 400M\$ into the broad area of energy sciences. LBNL has recently established a Solar Energy Research Center (SERC) funded by the United States Department of Energy, and it is home to several established and well-known independent research groups in Materials Sciences focused on basic energy science research. While SERC is an interdisciplinary approach that addresses solar storage mitigation via direct conversion of solar energy to transportation fuels, the other groups are concentrating on the development of low-cost and high-efficiency solar photovoltaic panels using inorganic nanomaterials as well as new compound semiconductor materials.

The most pressing challenges to turn solar energy into viable commercial alternatives involve developing new materials to turn the sun's radiation into electricity at affordable prices, and finding new materials to store energy at night. CIMAT is the premier Chilean institution in materials research and development, located at the leading School of Engineering in the country, with close ties to industry. Thus, it is ideally positioned to take advantage of the global surge in research and development activities in solar energy conversion.

SCOPE OF PROPOSED COLLABORATION

The Parties propose a strategic partnership between CIMAT and the Materials Sciences Division and Solar Energy Research Center (SERC), Lawrence Berkeley National Laboratory, to foster research collaborations in the broad area of renewable energy materials with a strong focus on solar energy conversion.

To this end, it is proposed that CIMAT and SERC participate in exploratory activities in these areas, cooperating and complementing each other's activities as much as possible. This collaboration will be based on a common project plan, which specifies the task of each institution. It is understood and agreed that each party will be solely responsible for its own costs for any activities under this MOU.

As a starting point, the collaboration will bring together postdoctoral scientists from Chile to work in the SERC, which will enable them (and therefore Chile) to establish a vibrant program in energy science and technology. This cooperation will help to foster key technological advances in solar energy conversion with strong possibilities for the creation of start up companies that will lead to the next generation of commercial solar energy systems. The first phase of this program will span five years. Specifically, 3-5 postdoctoral researchers from Chile will visit LBNL and carry out research embedded within SERC for periods of 1-3 years. The parties agree that visiting researchers from Chile will be required to meet all LBNL requirements for site access and that while at LBNL, all visiting researchers will be required to comply with applicable LBNL rules and procedures, including, but not limited to, environmental, health and safety requirements. These researchers will then return to Chile to take up positions in academia, industry or start ups in the solar energy market space. The ultimate vision of this program is to establish Chile as a world class player in energy related R&D, particularly solar, by 2020.


Further areas of collaboration and activities may be added by mutual written agreement of the Parties. The collaborators under this MOU will prepare a status report once per year, which will be provided to the management of the involved institutions.

TERM AND TERMINATION

This Memorandum of Understanding shall remain in force and effect for a period of five (5) years from the date on which the last party executes the MOU. This MOU may be amended in writing by the Parties or terminated by either Party upon ninety (90) days advance written notice.


The Parties to this Memorandum of Understanding hereby confirm their agreement to its terms by the following signatures:

UNIVERSITY OF CALIFORNIA,
LAWRENCE BERKELEY
NATIONAL LABORATORY,
SOLAR ENERGY RESEARCH
CENTER, MATERIALS
SCIENCES DIVISION


By 
Paul Alivisatos
Director, SERC
Deputy Director, LBNL

Date 11/12/2008

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INTERDISCIPLINARY
RESEARCH IN MATERIALS,
UNIVERSIDAD DE CHILE

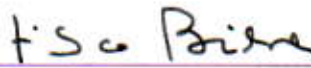
By 
Fernando Lund
Director, CIMAT

Date 11-20-2008

By 
Steven Chu
Director, LBNL

Date 11/17/08



By 
Francisco Brieva
Dean, FCFM

Date 11/20/2008