

## MEMORANDUM OF UNDERSTANDING

Between

The National Renewable Energy Laboratory

and

Renewable Energy Consortium for Research and Demonstration (RE-CORD) of the University of Florence

For coordination on *thermochemical conversion of biomass for the production of biofuels and chemicals*.

### INTRODUCTION

The National Renewable Energy Laboratory (NREL), is a national laboratory managed and operated by the Alliance for Sustainable Energy, LLC for the United States Department of Energy (DOE) under Contract No. DE-AC36-08GO28308.

Renewable Energy Consortium for Research and Demonstration (RE-CORD) of the University of Florence is an Italy-based, non-profit research Institution, funded and participated by the University of Florence and headquartered at Viale Kennedy 182, 50038 Scarperia in Florence, Italy.

As part of its mission for DOE, NREL conducts research and development on biomass conversion using thermochemical, biocatalytic, and catalytic processes to produce fungible fuels and chemicals. A significant research component is focused on developing separations processing for bio products and bio fuels.

As part of their mission, RE-CORD conducts research and development on the field of Renewable Energy, Agroenergy, and biomass conversion for biofuels and chemicals/bioproducts.

NREL or RE-CORD is each individually referred to as "Participant" and collectively as "Participants."

The purpose of this MOU is to encourage coordination in areas of mutual interest and benefit the Participants. Based on the principles of equality and reciprocity, this MOU is intended to serve as a general framework for planned coordination between the two Participants and is intended to facilitate discussions for the development of a more specific planned program of research and development (R&D) collaboration. Any specific program of R&D collaboration or sharing of confidential information is to be implemented through an appropriate written contract between the Participants.

### Section 1: Areas of Coordination and Collaboration

1. The coordination activities planned under this MOU, and the programs of collaboration contemplated in furtherance of, are focused on cooperation to maximize the benefit of each Participant's respective institutional interests, which may include the following selected topics:

- Increased understanding of biomass thermochemical conversion processes for the production of biofuels and related co-products from natural resources.
- Increased understanding of technological solutions for conversion processes like fast pyrolysis or hydrothermal liquefaction for the production of biofuels and chemicals from lignocellulosic feedstocks
- Increased understanding of aqueous phases waste stream production, processing, characterization, and separation that are derived from thermochemical conversion processes, mainly fast pyrolysis and hydrothermal liquefaction
- Increased understanding of co-product precursors separation from biomass thermochemical conversion processes in a biorefinery concept
- Increased understanding of fractional condensation of fast pyrolysis vapors
- Increased understanding of energy recovery from biomass thermochemical conversion wastewater and residues to decrease the biofuel production costs and increase the overall conversion efficiency.
- Shared investigations in analytical chemical characterizations of products and fuels derived from fast pyrolysis and hydrothermal liquefaction

## **Section 2: Forms of Coordination**

Planned coordination under this MOU may include:

1. Exchange of published scientific and technical information, publications, and reports;
2. Meetings organized to discuss specific topics identified in Section 1, including conferences, seminars, and workshops; and
3. Exchange of scientists, engineers, and other specialists for participation in workshops, conferences, seminars, working sessions, and model-development activities. Each Participant should abide by the health, safety, and environmental requirements of the host Participant when on an exchange assignment at the host Participant's facility.

## **Section 3: Funding**

1. The scope of coordination activities under this MOU should be mutually determined in light of time, resources and/or funds available at both institutions for the types of coordination undertaken and by such other financial assistance as may be obtained by either Participant from external sources.
2. Unless the Participants otherwise determine in a separate written agreement, each Participant is to be responsible for the costs it incurs in participating in the coordination contemplated by this MOU, including all administrative costs, overhead expenses, labor costs, insurance costs, travel expenses and similar costs.

## **Section 4: Researcher Exchanges**

1. Each Participant retains responsibility for its own personnel in relation to researcher exchanges to carry out coordination under this MOU.
2. Each Participant's personnel is to abide by the regulations, policies, and procedures of the host Participant in carrying out activities under this MOU, including protection of business proprietary information, protection of intellectual property, compliance with export control



laws and regulations, conditions of coordination and decorum, health, safety, and security requirements, and all other terms under which personnel are authorized to participate in researcher exchanges at the host Participant's facility. Such activities may require entry into separate written agreements.

3. Each Participant is to be solely responsible for its own personnel in relation to matters such as visa and travel formalities, appropriate insurance (medical insurance and medical evacuation and repatriation insurance), travel expenses, and suitable living accommodation and expenses.
4. To the extent possible, the host Participant should assist in facilitating travel arrangements of the other Participant's personnel in relation to researcher exchanges in accordance with its applicable procedures governing foreign national access to the host Participant's facility.

#### **Section 5: Dissemination of Information**

Each Participant intends to participate in the coordination in a manner that facilitates exchanges of publicly available, non-proprietary business information. Subject to applicable laws and regulations of its country, each Participant may disseminate information, data, and reports of the coordination carried out under this MOU. NREL reserves the right to have DOE/BETO review any joint publications prior to publication.

#### **Section 6: Use of Information**

Any information transmitted by one Participant to the other Participant under this MOU should be accurate to the best knowledge and belief of the transmitting Participant.

#### **Section 7: Intellectual Property**

The Participants do not anticipate the transfer of rights in intellectual property or the sharing of confidential information to occur under any planned coordination activity under this MOU. If it appears that a particular activity may lead to the creation of intellectual property or the disclosure or exchange of confidential information, the Participants should enter into an appropriate written agreement therefor.

#### **Section 8: Future Collaborations**

An appropriate written contract is required prior to any specific future research and development collaboration, including the exchange of intellectual property or confidential information, or the transfer or commitment of funds between the Participants. Any such contract should include a work plan, staffing requirements, cost estimates, funding sources, the adequate and effective protection and allocation of intellectual property rights, and other arrangements or conditions; and must be authorized under NREL's Management and Operating Contract.

#### **Section 9: Review of Coordination**

The Participants intend to review the coordination undertaken under this MOU as a means to ascertain its effectiveness, document achievements and lessons learned, recognize technical personnel, and identify and plan areas for potential future collaboration that involves the conduct of research and development. This review should take the form of periodic meetings of representatives of each Participant to discuss ongoing coordination and to identify and plan

future collaboration that involves the conduct of research and development activities.

#### **Section 10: Contacts**

One or more designated representatives from each Participant should oversee, manage and facilitate implementation of this MOU in cooperation with each other on behalf of their respective institutions. All notices, communications and coordination should involve, at a minimum, the following individuals, their successors and/or designees as follows:

(a) For the National Renewable Energy Laboratory:

Dr. Kim Magrini and Dr. Nolan Wilson  
15013 Denver West Parkway  
Golden, CO 80401  
Tel: 1 303 384-7706 (K. Magrini), 303-384-7724 (C. Mukarakate)  
kim.magrini@nrel.gov, nolan.wilson@nrel.gov

(b) For the Renewable Energy Consortium for Research and Demonstration:

Dr.Ing.David Chiaramonti  
40 Viale Morgagni  
Florence, Italy, 50134  
Tel: +39 055 2758690  
Email: david.chiaramonti@unifi.it

#### **Section 11: General Considerations**

1. This MOU is not intended to create any legally binding obligations between the Participants.
2. Each Participant should conduct the coordination contemplated by this MOU in accordance with applicable laws and regulations to which it is subject and international agreements to which its government is party.

#### **Section 12: Commencement, Modification and Discontinuation**

1. Coordination under this MOU may commence upon signature, and may continue for a period of two (2) years, unless discontinued in accordance with paragraph 3 of this section.
2. The Participants may modify this MOU at any time by mutual consent in writing.
3. The Participants may discontinue coordination under this MOU at any time by mutual consent in writing. Alternatively, a Participant that desires to discontinue its participation in this MOU should endeavor to provide the other Participant at least 90 days advance written notice.

Signed in duplicate.

For

The National Renewable Energy Laboratory

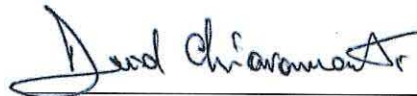


Adam Bratis

Title: Associate Laboratory Director  
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For

Renewable Energy Consortium for Research and  
Demonstration (RE-CORD) of the University of  
Florence



David Chiamonti  
Dr.Ing.

June 17<sup>th</sup>, 2019

Date

Golden, Colorado, US

Place

June 16<sup>th</sup>. 2019

Date

Florence

Place

