Masdar INSTITUTE معهد مصدر

WATERGY International Group

CIRIAF

# ALBEDO PROJECT FOR UAE

WATERGY MENA

# LETTER OF INTENT

This Letter of Intent dated as of _February __2__, 2014_____is between the following Parties:

- **MASDAR INSTITUTE OF SCIENCE AND TECHNOLOGY**, (hereinafter "**MASDAR INSTITUTE**") a not-for-profit university with principal offices at P.O. Box 54224, Abu Dhabi, United Arab Emirates;
- **CIRIAF** "Centro Interuniversitario di Ricerca sull'Inquinamento da Agenti Fisici" of the University of Perugia (hereinafter "**CIRIAF**") with registered office at Via G. Duranti 67, 06125 Perugia, in person of **the Director Prof. Franco Cotana**; and
- **WATERGY INTERNATIONAL GROUP** by means of its own division **WATERGY MENA** (hereinafter "**WATERGY IG-MENA**"); with elected offices at P.O. Box 45667, Abu Dhabi, United Arab Emirates;

**WHEREAS**

(i). **UAE Government** is Leader in the Region for eco-friendly technologies for the Carbon Dioxide footprint reduction and sustainable/green environment policies.

(ii). **Masdar Institute** is a graduate-level research institution dedicated to becoming a world-class research- driven institution focused on advanced research and clean energy sustainable technologies;

(iii) **CIRIAF** has developed a methodology aimed at mitigating the global warming problem by improving the Earth and surfaces albedo (patent no. PG and PG 2006 A 0086 2007 A 0009);

(iv) **WATERGY IG-MENA** is the Area Division of a multinational network of companies focused on the diffusion of High reflective coatings technology for Heat Island effect and energy consumption for cooling reduction and Sustainable Energy production.

(v) The Parties have considered their respective institutional and business objectives and capabilities, and **wish to start a possible cooperation under a Framework Agreement** in supporting objectives of (a) developing an integrated product (e.g., research, consultancy and/or certification as the case may be) for the worldwide Climate change, energy savings and the global warming mitigation market (hereinafter, the "**Market**"), and (b) combining their respective expertise in order to study and verify the impact of specific surfaces and materials with high reflective properties (jointly, the "**Albedo Project**");

**THEREFORE**, , **Masdar Institute**, **CIRIAF** and **WATERGY IG-MENA**, (hereinafter "the Parties" or "a Party") through this Letter of Intent, intend to work together to pinpoint the issues and formalize their cooperation in finalizing a research project entitled "Albedo Project for UAE" (hereinafter "the Albedo Project" or the "Project").

**Scope of this Letter of Intent**

Through this Letter of Intent the Parties intend to formalize the terms of their current co-operation regarding the Albedo Project and namely the preliminary activities aimed at possibly achieving the goals set for the feasibility study, marketing, demonstrations, evaluations, proposals, possible contracts and subcontracts relating to the Albedo Project applied to the UAE and throughout the Region.

**Project Socio-economical impacts**

The Parties are in agreement that the inclusion of the albedo control technologies as a strategy for Global Warming mitigation, energy savings and the assignment of an economic tradable value, e.g. **Emissions Credits**, may be strategic for territories in the tropical and mid latitude areas, low cloudiness areas; interesting economic opportunities and International sources of cooperation may arise for all the developing and young industrialized countries in such areas that might gain from the **Emissions Trading Credits**. However, nothing in this Letter of Intent constitutes an endorsement by any Party as to the technical or economic merits of the technologies that will be the subject of the Project, either express or implied.

**Project Abstract and Project Objectives**

A preliminary abstract of the Project and its Objectives is attached as an Addendum to this Letter of Intent. The Addendum serves as a statement of interest in directions to be explored among and between the Parties in anticipation of finalizing an agreement between them as to the Albedo Project. The Addendum is not intended by the Parties to be a definitive abstract and does not serve as a commitment on the part of the Parties to enter into a formal agreement regarding it. Any binding obligations on the part of any of the Parties, including the financial obligations incurred or accepted by any of them, will be subject to mutual written agreement.

**Communication and Notices**

The Parties indicate the following individuals with responsibility for continuing discussions pertaining to the Letter of Intent.

For **Masdar Institute**:

Attn: Dr. Afshin Afshari
P.O. Box 54224
Abu Dhabi, UAE
E-mail: aafshari@masdar.ac.ae

For **CIRIAF**:
Attn: Prof. Franco Cotana
Via G. Duranti 67,
06125 Perugia ITALY
E-mail: cotana@crbnet.it

For **WATERGY-IG-MENA**:
Attn: Mr. Francesco Favarò
P.O. Box 45667
Abu Dhabi, UAE
E-mail: ceo@watergyinternational.com
Cc: wajzori@watergyinternational.com

Any notices required to be given by any of the Parties pursuant to this Letter of Intent shall be in writing and sent to the Parties as follows:

For **Masdar Institute:**
Office of Sponsored Programs
Attn: Dr. Steve Griffiths
P.O. Box 54224
Abu Dhabi, UAE
E-mail: sgriffiths@masdar.ac.ae
Cc: mnijmeh@masdar.ae

For **CIRIAF**:
Attn: Prof. Franco Cotana
Via G. Duranti 67,
06125 Perugia ITALY
E-mail: cotana@crbnet.it
Cc: federico.rossi@unipg.it

For **WATERGY-IG-MENA**:
Attn: Mr. Francesco Favarò
P.O. Box 45667
Abu Dhabi, UAE
E-mail: ceo@watergyinternational.com
Cc: wajzori@watergyinternational.com

**Entry into Effect and Duration**

This Letter of Intent shall be entered into as of the date first written above and shall remain in effect for a period of **ONE (1) YEAR** unless earlier terminated by any Party or by mutual agreement of the Parties. Any Party may terminate this Letter of Intent by giving the other Parties at least ninety (90) days prior written notice of its intention to terminate.

**Language**

The Parties shall jointly agree to use English as language for all documents and communications relating to this Letter of Intent

**In witness whereof, the Parties hereto have entered into this Letter of Intent as of the date first written above.**

For **MASDAR INSTITUTE**

By: _____

Name: Mr. Hamza Kazim

Title: Vice President for Operations and Finance

For **CIRIAF**

By: _____

Name: Prof. Federico Rossi

Title: Scientific Adviser, CIRIAF

For **WATERGY IG-MENA**

By: _____

Name: Francesco Favaro

Title: CEO/General Manager

**ADDENDUM TO LETTER OF INTENT**

**Project Abstract**

Albedo Control technologies / cool roofs could be proposed as a complementary strategy for GW mitigation in order to cope International commitments against Climate Changes.

Albedo Control may introduce three separate contributions:

- the direct contribution to the mitigation of global warming by reflecting out of the atmosphere the component of short wave radiation coming from the sun;
- the indirect contribution generated by the energy saving for reducing cooling requirements of buildings;
- the indirect contribution for mitigating the urban heat island phenomenon.

Since the positive compensatory mechanism is particularly effective in all countries interested by a high sun radiation (i.e. UAE), the project will provide the arrangement of an experimental facility in UAE in order to validate the effectiveness of such technologies. For UAE locations it was quantified that about 7 $m^2$ of high reflective surface (coefficient of reflection equal to 0.9) can offset 1 $CO_{2eq}$ tons. For this reason, a test site of more than 100,000 $m^2$ (One Hundred Thousand square meters) is required for the experimental monitoring. The building/s which is part of an urban canyon is preferred in order to complete the task 3 objective.

Indeed, an innovative methodology proposed by **CIRIAF** will be applied to quantify the $CO_{2eq}$ offsetting potential of high reflective surfaces/cool roofs with respect to the geographical and meteorological characteristics of the site and as a function of the reflectivity features of the surfaces. Moreover, **CIRIAF** will propose an innovative model to quantify the indirect environmental benefit for the mitigation of the heat island effect. The continuous monitoring of the facility should quantify both the energy savings in buildings and the indoor air quality improvement via cool roofs applications.

In this context, innovative materials will be provided by **WATERGY IG-MENA** and their performances will be jointly evaluated by **CIRIAF** and **MASDAR INSTITUTE**. In particular:

- **WATERGY IG-MENA** will properly provide and install high reflective coatings on the case study buildings and surfaces, taking into accounts an adequate surface to test any possible configuration in terms of orientation, inclination angle and apparent color;
- **CIRIAF** will measure and evaluate the heat island effect reduction and the $CO_{2eq}$ abatement (offset) potential given by the Albedo Control (AC) materials by using its patented methodology;

- **MASDAR INSTITUTE** will develop a detailed head island model of downtown Abu Dhabi (outcome will be compared to the CIRIAF model); will measure and evaluate remotely sensed data; will estimate and/or measure the energy savings of the case study building as well as relevant weather data useful for quantifying the $CO_{2eq}$ abatement potential obtained by the AC materials.
- Data collected by **CIRIAF** results and **MASDAR INSTITUTE** results will jointly contribute to the overall $CO_{2eq}$ abatement.

**Project Objectives**

✓ **Task 1 – To install high reflective coatings on the case study surfaces**

**(WATERGY IG-MENA proper knowledge)**

Installation of high reflective coatings / cool roofs on the surfaces of the individuated case study building. **WATERGY IG-MENA** will properly provide and install the high reflective coatings by best practice techniques given its expertise in the coating installation field.

✓ **Task 2 – To reduce power consumption for thermal conditioning of the building**

**(MASDAR INSTITUTE proper knowledge)**

Monitoring and/or estimation of the energy performances of the case study facility. **MASDAR INSTITUTE** will measure/estimate the energy requirement of the case study building (before and after the installation of the high reflective coatings); the results will be used by **MASDAR INSTITUTE** to evaluate the reduction of energy used for the air conditioning of the tested building.

✓ **Task 3 - To model heat island effect with application to the building facility**

**(CIRIAF and MASDAR INSTITUTE proper knowledge)**

With respect to the indirect effect of mitigation of urban heat island phenomenon, **CIRIAF** will propose an innovative calculation tool (theoretical and experimental procedure) to assess the decrease in air temperature inside an urban canyon, as a function of the reflective characteristics of the canyon's walls and roofs (e.g. directionality or diffusivity of the coverage layers). The project will provide the experimental validation of such methodology by means of data monitoring in building facilities with respect to the close urban context.

✓ **Task 4 - To quantify the $CO_{2eq}$ abatement (offset) potential of AC techs/cool roofs**

**(CIRIAF proper knowledge: MASDAR INSTITUTE proper knowledge support)**

The direct positive effect induced by albedo control surfaces /cool roofs will be quantified by **CIRIAF** and **MASDAR INSTITUTE** in terms of $CO_{2eq}$ offsetting potential with respect to reflectivity features, surface localization, extension and inclination; local weather data are also considered in the calculation. **CIRIAF** will provide the application of such methodology to the case study in order to achieve the further development and experimental validation of the innovative methodology. The positive effects on the environment may be translated into an economical opportunity if a legal value will be assigned to high Albedo surfaces. In this way this methodology may be recognized as an official $CO_{2eq}$ offsetting technology into an emission trading scheme as well the European one. Actions of promotion and implementation of policies are required to achieve the issue.

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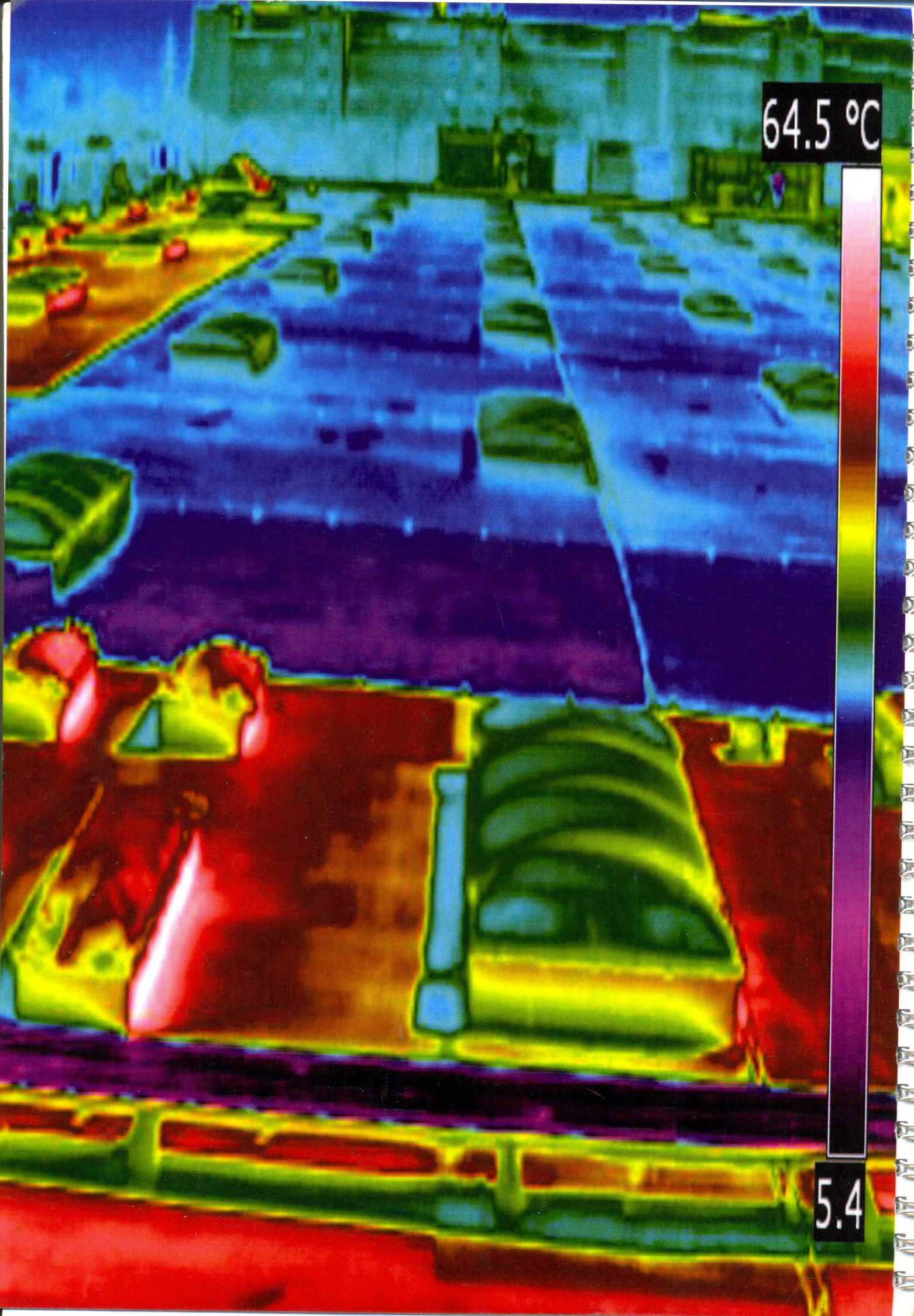
64.5 °C
5.4